



Social Protection Discussion Paper Series

An Asset-Based Approach to Social Risk Management: A Conceptual Framework

**Paul B. Siegel
Jeffrey Alwang**

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***AN ASSET-BASED APPROACH TO SOCIAL RISK MANAGEMENT:
A Conceptual Framework***

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Human Development Network
Social Protection Unit
The World Bank
1818 H. St, NW
Washington, D.C. 20433 USA

Prepared by:

Paul B. Siegel
Senior Lecturer and Head
Department of Economics and Management
Tel Hai Academic College
Upper Galilee 12210 ISRAEL
siegelpb@hotmail.com

and

Jeffrey Alwang
Associate Professor
Department of Agricultural and Applied Economics
Virginia Tech, Blacksburg, VA 24061 USA
alwangj@vt.edu

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ABSTRACT

There is increasing concern about the vulnerability of poor and near-poor rural households, who have limited capabilities to manage risk and often resort to strategies that can lead to a vicious cycle of poverty.

Household-related risk is usually considered individual or private, but measures to manage risk are actually social or public in nature. Furthermore, various externality issues are associated with household-related risk, such as its links to economic development, poverty reduction, social cohesion, and environmental quality. Hence the need for a holistic approach to risk management, or “social risk management”, which encompasses a broad spectrum of private and public actions. An asset-based approach to social risk management is presented, which provides an integrated approach to considering household, community, and extra-community assets and risk management strategies.

The conceptual framework for social risk management focuses on rural Sub-Saharan Africa. The paper concludes with several suggestions on moving from concepts to actions.

EXECUTIVE SUMMARY

Risk is pervasive in many rural areas, especially in Sub-Saharan Africa. Increases in risk increase the vulnerability of poor and near poor households. The objective of social risk management is to enable vulnerable households to better manage risk. In this paper we present a conceptual framework to better understand the complex decision-making process at work in risk management at the household, community and extra-community levels.

Adaptations to risk by vulnerable households, using various risk reducing, mitigating and coping strategies, may lower observed vulnerability, but increase households' vulnerability over the longer term. In addition, inefficient risk management strategies can lead to lower expected incomes, and might only be effective for certain types of idiosyncratic risks. When households adopt inefficient risk management strategies, assets are often depleted (sometimes with negative externalities), and asset accumulation (when possible) is biased towards precautionary savings. It is difficult to quantify the degree of inefficiency associated with current household risk management strategies, but the sheer breadth of examples presented in this paper suggest that these inefficiencies are substantial. The inability of vulnerable households to accumulate assets that increase their income-generating potential perpetuates the vicious cycle of poverty and limits economic development.

The vicious cycle of vulnerability can be portrayed as:

Limited asset base => management of risk leads to inefficient allocation of assets => low returns
=> low consumption => low savings and investment (and dissavings) => limited (declining) asset
base => lower returns, consumption and savings

The asset-based approach presented in this paper uses a broad definition of assets, a corresponding broad definition of the determinants of household welfare, and provides an inter-temporal framework to compare how households' wealth (as measured by their asset base) evolves over time. The key issue is how, with a given level of wealth, households perceive risk, set their management objectives, and allocate their assets in response to risk in the short-term, and how these short-term decisions affect households' welfare and social welfare in the longer-term.

Households reallocate their assets in response to risk and it is important to consider both the expected returns (E) and variability of returns (V) to their asset portfolio. Households with low E and V are vulnerable because even small risks can cause relatively large negative impacts on their welfare. Poor households with higher E, but also exposed to risks must protect themselves from falling into poverty. Both types of poor households allocate their assets to provide self-insurance and finance in an inefficient manner, sometimes with negative externalities. These asset reallocations lead to lower short-term returns and have an impact on the longer-term vulnerability of the households by limiting savings and investments in income-generating assets.

Asset portfolios and external factors such as existence of markets, access to infrastructure, policies and institutions influence risk attitudes. These factors also determine the availability of risk management instruments. This paper emphasizes the links between households, the community, and extra-community levels in terms of assets, risk instruments (asset and risk pools), and economic structure (inter-sectoral and spatial linkages).

The major thrust of the paper is to present a conceptual framework. However, the paper concludes with a section that suggests several possible actions that can be undertaken in the context of an asset-based approach to social risk management.

AN ASSET-BASED APPROACH TO SOCIAL RISK MANAGEMENT: A Conceptual Framework

1. INTRODUCTION

Risk and uncertainty are universal characteristics of life in rural areas of LDCs. Sources of risk include natural hazards like drought, commodity price fluctuations, illness and death, poorly functioning or missing input and output markets, sudden changes in price and non-price policies, changing social relationships, unstable governments and armed conflicts. All of these risks can cause losses in household welfare. Some risky events, like drought, simultaneously affect many households in a community or region (i.e., covariate risk). Other risky events, like most illnesses, are household specific (i.e., idiosyncratic risk). Poor households have a limited asset base, and face poorly functioning or missing insurance and finance markets, and a confined risk pool. The risk management strategies adopted by rural households thus tend to be inefficient and have negative implications for social welfare and equity. Private and social welfare losses result both from the risky events and from household strategies to manage the risk.

Households, for example, that adopt lower-yielding drought-resistant crops as a means of reducing production risk are rational in their response to risk, but an insurance scheme that allows risk pooling to reduce this type of covariate risk might represent a short-term improvement in social welfare. In some cases, the negative impacts of idiosyncratic risk can be mitigated through informal insurance mechanisms, based on social ties and networks. However, such informal insurance can be costly and might not be available when needed most.

Furthermore, household risk management strategies can increase the vulnerability of the poor and near poor over time. Adaptations to risk by vulnerable households (i.e., consumption smoothing using various coping strategies) might lower observed poverty, but also might increase their vulnerability over the longer term. For example, vulnerable households often resort to coping strategies that deplete or slow their accumulation of productive assets (e.g., skipping meals, taking children out of school, mining the soil or overharvesting natural resources). Although this behavior can help households lessen the immediate impacts of risk, it can result in dynamic inefficiencies that lower mean incomes (and possibly increase the variability of incomes) in subsequent time periods, and thereby perpetuate the vicious cycle of poverty. This behavior by vulnerable households can also lead to negative externalities. The lack of assets, the failure of markets, and lack of public interventions to provide for efficiency-enhancing risk management strategies have adverse consequences for development and inhibit efforts to reduce poverty through broad-based growth.

Recent changes in economic, political, social, and natural and environmental conditions have, in many cases, led to an increase in the risks faced by rural households. Some of these changes are policy induced (e.g., structural adjustment policies) and intended to increase economic growth and development through more efficient use of resources. For example, increased commercialization of economic relationships and the liberalization of factor, product and capital markets are expected to stimulate growth by allowing households, communities, regions within countries, and countries to pursue their individual comparative advantages. Hand-in-hand with commercialization and economic liberalization has come an opening of political systems with increased participation, and more democratic governance. In turn, there has been movement toward decreased government control over agricultural input and output markets, civil service reform, decentralization and privatization of government services.

As a result of the economic and political liberalization, rural areas are more linked to national and international economic forces than ever before. The reforms and increased global integration are expected to create new economic opportunities and improve efficiency and equity over time. But, in the short term, they are often associated with increases in risk and uncertainty. To make matters worse, the rapid economic and political change has caused the breakdown in traditional social arrangements that served as informal safety nets for vulnerable households.

Many households are also facing changing natural and environmental conditions resulting from, and in, soil erosion, declining soil fertility, desertification, deforestation, etc. These changes, and others such as large scale irrigation projects and dams, can contribute to changing weather patterns and environmental conditions and, hence, alter the risks and opportunities faced by households, communities, regions and nations.

Social risk management involves public measures intended to assist households manage risk and uncertainty in order to reduce vulnerability, improve income and consumption smoothing, and contribute to economic development (Holzmann and Jorgensen, 1999). While household-related risk is usually considered individual or private, many measures to manage household risk are often social or public in nature. Furthermore, various externality issues are associated with household-related risk, such as its links with economic development and poverty reduction, social cohesion, and environmental quality. Hence, the need for a holistic approach to social risk management, that encompasses a broad spectrum of private and public actions and partnerships.

The objective of this paper is to provide a conceptual framework for social and other types of risk management in rural areas, with a focus on rural areas in Sub-Saharan Africa (SSA). The majority of rural households in SSA are vulnerable with respect to their survival during and between years, in particular, those living in semi-arid and sub-humid areas (Sahn, 1989; Sanders, *et. al.*, 1996). The framework will be grounded in the literature on risk, its management, and the relationship to desired outcomes of reduced vulnerability and broad-based growth. The conceptual framework is an asset-based approach. The necessity for, and effectiveness of, social risk management strategies need to consider household-specific factors, notably its asset base. Household assets and risk management strategies, in turn, interact with assets (i.e., policies, investments and actions) at the community and extra-community level.

The paper begins with definitions of key concepts related to risk and its management. Following this, different sources of risk are described. Then, the impacts of risky events on poor and near-poor households are discussed, along with the relationship between these impacts and the risk pool. These risks affect households and society as a whole differently depending on a number of factors including household management objectives and their asset base. In section 3 the links between management strategies and different asset portfolios are described and analyzed. The role of assets in managing risk is presented in the context of an asset-portfolio approach to risk management. The focus in section 3 is on household risk management strategies, whereas in section 4 the focus is on community and extra-community roles. The paper concludes with a summary of major points and offers some suggestions for moving from concepts to actions in social risk management.

2. AN OVERVIEW OF RISK AND RISK MANAGEMENT

2.1 Definition of Risk

The term “risk” refers to uncertain (i.e., stochastic) events and outcomes¹ with known or unknown probability distributions. In this paper we use the terms “risk” and “uncertainty” interchangeably.² Perceptions of risk are based on subjective beliefs about the occurrence of uncertain events and their subsequent outcomes.³

Household risk management refers to the set of mechanisms used by households to deal with anticipated or actual losses associated with uncertain events and outcomes. These mechanisms are employed depending on beliefs about the probability of events’ occurrence and anticipated impacts on household welfare. Risk management can affect households through changes in income and consumption, in investment patterns, and in livelihood strategies. All of these are influenced by, and influence, the asset base. Dynamic impacts of risk are reflected through investment patterns and impacts on the asset base.⁴

Household risk management strategies can involve activities to reduce, mitigate, or cope with risk. Households adopt different risk management strategies, based on their attitudes toward risk, objectives with respect to risk, other objectives, their asset base, and external economic, social, and political conditions. The existence of insurance and finance markets, both formal and informal, have a critical influence on the risk management strategies adopted by households.

Social risk management involves policies and programs that help poor and near poor households manage risk. The role of policy in social risk management depends on the nature of the risk, the ability of households to respond, the nature of the response, and social consequences of the

¹ There is a difference between the occurrence of an event and an outcome, which results from an event, but can be influenced by human actions. For example, a drought is an event, whereas a famine is an outcome. Not every drought results in a famine. Famines can be mitigated by human actions (Ravallion, 1997).

² Different definitions of risk and uncertainty are found in the literature. Sometimes risk refers to situations where probabilities can be attached to the occurrence of events that influence a decision-making process, and uncertainty to situations where it is not possible (by the decisionmaker or anyone else) to assign probabilities. Sources distinguish between objective and subjective risk. Objective risk is based on secondary information and data about the probability of an event’s outcome. Subjective risk is based on the decisionmaker’s perception about the probabilities of events and outcomes. Anderson, *et. al.* (1977) argue that all probabilities are subjective because the decisionmaker must subjectively assess whether any objective data are appropriate for a decision. Current usage usually implies little distinction between risk and uncertainty, since both terms stress the stochastic nature of returns from a portfolio of assets.

³ The difference between subjective risk and objective risk in predicting households’ behavior can be important. Due to imperfect information and other factors, subjective perceptions of risk might differ from objective probabilities. For example, low adoption rates of new technologies that “should be preferred” by the poor, might be explained by high subjective risk perception relative to the objective risk measured by researchers (Sanders, *et. al.*, 1996). Or, poor individuals might be unaware of certain risks, and adopt “risky behavior” (Lewis and Nickerson, 1989). Thus, there is an important public role for information dissemination to promote the convergence of subjective and objective risk perceptions.

⁴ Risk, and adaptation to it, need to be conceptualized as a dynamic process. Decisionmakers are assumed to have priors about the probability distribution of events. Based on these priors, their asset base, and their preferences toward risk, they react. This reaction takes the form of allocating assets, purchasing are insurance, etc. Following the reaction, the state of nature is revealed (an event occurs). Households evaluate this realization of the event and react to it. This reaction is conditioned on their prior actions, their asset base, and their risk preference. The experience with respect to the realization of the event can affect the prior probability distribution (learning occurs) and different behavior in subsequent periods.

response. Social risk management is closely intertwined with poverty reduction policies for several reasons, as will be detailed in this paper. First, risk causes direct welfare losses because people tend to be risk averse. Evidence suggests that the poor are more risk averse than the non poor, and thus suffer proportionally greater welfare losses for given levels of risk (Alderman and Paxson, 1992; Murdoch, 1995; Feinerman and Finklestein, 1997). Second, the adjustment of the poor to risk can cause dynamic efficiency losses that perpetuate the vicious circle of poverty. Third, the poor are more susceptible to risk because they have fewer tools at their disposal to defend against risky events and to subsequently deal with the problem.

Since poverty reduction is a primary policy focus in SSA, and since there are numbers of failures in markets for risk management, risk management may require policy interventions. Social risk policies should recognize the central role of the household's asset position in its vulnerability and ability to manage risk. Risks are manifested and transmitted in a variety of ways, but the impact of risk on households and their response to it depend, *ceterus paribus*, on their asset base. Impacts of risk are dynamic (due to changes in household investments and resource allocation), and can create spillovers (i.e., externalities) within communities and over space. The dynamic impacts on private and social welfare will depend on the particular response of households, which depends on their asset base.

2.2 An Asset-based Approach

Poverty is associated with low asset bases and low asset productivity. Households caught in the "poverty trap" are vulnerable, and their response to shocks can lead to lower quantities and qualities of assets. There has been a recent revival in asset-based approaches to poverty analysis (e.g., Reardon and Vosti, 1995; Zimmerman and Carter, 1996; de Janvry and Sadoulet, 1996; Guyer, 1997; Moser, 1998; Carter and May, 1999).⁵ The asset-based approach uses a broad definition of assets (e.g., economic, social, political) and a corresponding broad definition of the determinants of welfare, and provides an inter-temporal framework to compare how wealth evolves over time. The key issue is how, with a given level of wealth, households allocate their assets in response to risk.

Assets interact with risk in several ways. First, the sources of risk impact households through their impact on the value and productivity (and variations in the value and productivity) of assets. Thus, risks are transmitted to household through their assets. Second, households reallocate their assets in response to risk. These reallocations affect short-term returns and the variability of returns. They also have an impact on the longer-term vulnerability of the households via their impact on savings and investments. Third, a household's risk attitudes are, to a large extent, influenced by its asset portfolio, with wealthier households -- in terms of productive natural and physical assets, education, etc.⁶ -- tending to be less risk averse, more efficient in resource allocation, and better situated to handle risk-related losses (Morduch, 1995). Fourth, poor households tend to pay a higher cost (actual outlays and opportunity costs) for reducing,

⁵ The household asset-based approach draws heavily on the seminal work by Sen. The approach also draws on the livelihoods and food insecurity framework associated with the Institute for Development Studies (IDS) at the University of Sussex (e.g., Davies, 1993; Devereux, 1993; Swift, 1993; Scoones, 1998). An asset-based approach to welfare reform in the United States has also been proposed by Sherraden (1991). The asset-based approach also has close parallels to the environmental accounting framework for national accounts, where national assets (or wealth), rather than national income is used as a measure of national welfare.

⁶ Reviewing the results of various studies, Feinerman and Finkelstein (1997) note that households with less wealth, less education and higher dependency ratios tend to be more risk averse. Less education and a high dependency ratio is also associated with a weak asset base.

mitigating, and coping with risk (Zimmerman and Carter, 1996). Fifth, poorer households tend to adopt risk management strategies that concentrate in lower risk and lower return assets, which can lead to a poverty trap and exacerbate asset and income inequality (Binswanger and Rosensweig, 1989; de Janvry and Sadoulet, 1996; Jalan and Ravallion, 1998; Carter and Zimmerman, 1998). These five factors can contribute to a vicious cycle of poverty.

2.3 Poverty, Risk and Household Vulnerability

The literature on vulnerability recognizes explicitly that poverty, as it is usually defined, is a static concept, yet the relationship between outcomes, such as consumption and life-cycle welfare is dynamic. Vulnerability, if it is to be a useful concept, must embody both risk and the household's position relative to the poverty line. A household that is well above the poverty line, but who faces a small risk of falling below it, cannot be considered more vulnerable than a household with a level of certain consumption that is below the poverty line. Thus, it is important to consider both levels of income (or consumption) and deviations from this expected value.⁷

Poverty tends to be an *ex post* state of being; that is, a household is poor if and only if its consumption (or whatever objective criterion is used for measurement) falls below a level deemed necessary for a minimum level of well-being.⁸ A household may move in and out of poverty, but at any point in time, it is classified as poor or not poor.⁹ Vulnerability is both an *ex ante* and an *ex post* state associated with the probability of falling into a state of destitution. A vulnerable household may have a level of welfare at a point in time that exceeds the minimum level, but under a different state of nature this household would fall below this level. The probability distribution associated with each state of nature is conditioned on the broad set of assets a household has access to. Households with more assets are less likely to experience welfare losses over time. Thus the distinction between transient and chronic poverty is somewhat arbitrary. In a vulnerability context, both transient and chronic poor are vulnerable.¹⁰ An axiomatic approach is presented in the Annex to formalize a definition of vulnerability.

According to the asset-based approach, it is important to consider the ability of households to break out of the cycle of poverty. There are several terms that have been used that emphasize this dynamic approach to poverty, which are closely related to how we consider vulnerability. *Susceptibility* is the probability that a household will experience a welfare loss from a given event. For example, a malnourished individual is more susceptible to disease than a well-nourished individual. *Resilience*, in the context of vulnerability, is the household's ability to resist

⁷ Glewwe and Hall (1998) claim that the poor are not always vulnerable and that vulnerability can be divided into two types. The first vulnerable group is those that are vulnerable to specific shocks, while the second includes a more general notion of vulnerability to changes in socioeconomic conditions (market-induced vulnerability). While this distinction is useful in some contexts, it means, for example, that the poorest of the rural poor (near-subsistence farmers) are not considered vulnerable, because they are not integrated into markets and thus are not impacted policy shocks nor market variability.

⁸ These distinctions are somewhat semantic. Substantial literature exists on concepts of poverty that take into account probabilities and "opportunities" for consumption. See Ravallion (1992) for a discussion.

⁹ Recent literature on the dynamics of poverty (e.g., Jalan and Ravallion, 1998) recognizes that most poor households are not permanently poor and significant movement of welfare occurs above and below poverty lines. Baulch and McCulloch (1998) estimate a poverty transition matrix for rural Pakistan using a simple hazard model. As many as one-half the households in their panel move out of poverty each year.

¹⁰ As pointed out by Mellor (1991, p.5): "... by far the most important means of reducing sources of risk to the mass of poor people, is to raise their incomes well above a defined absolute poverty line. Obviously, with a given amount of variance in income and even with substantial increase in that variance, the probabilities of falling below the absolute poverty line decrease as the average income is raised."

downward movement in well-being (Moser and Holland, 1997), and *sensitivity* is the extent to which the household's asset base is prone to depletion following adjustments to risk (Ellis, 1998). Reardon and Vosti (1995) point out that certain households that are not *consumption poor* in all years may, in fact, be *investment poor* because their asset base declines as they draw down their natural resource assets over time, as they are unable to generate sufficient surpluses to invest in protection, maintenance or enhancement of their assets. As such, income-generating potential declines over time. Such households could be considered vulnerable.

2.4 Sources of Risk

Rural households face numerous sources of risk, which are manifested through changes in asset values, returns on assets and general measures of well-being (e.g., health status). Risk and uncertainty with respect to nature and the environment, markets, policies and institutions, household health, social and political systems can impact household welfare and decisionmaking both during and between years. For many vulnerable households, intra-seasonal risk might be the most important type of risk affecting their management strategies (Sahn, 1989; Sanders, *et al.*, 1996). Many households' time horizon for risk management tends to be short, and the ability to save and accumulate assets is limited.

The sources of risk can be broadly classified as (Holden, *et al.*, 1991; Hazell, 1992; Ellis, 1993):

- 1) Production Risk due to Natural Hazards and Environmental Damage: includes the unpredictable impact of climate, pests and diseases, and other natural hazards on production. Natural hazards are the source of production (or yield) risk. Environmental risks range from salinity and silting problems associated with irrigation, poor water quality from run-off, drainage, and erosion, changing weather patterns resulting from global climate change, problems associated with deforestation, changing ecosystems and impacts on wild flora and fauna, etc.
- 2) Production Risk Due to Random Input Availability: includes management interactions that cause input:output relationships in agriculture to be uncertain (e.g., plant uptake of fertilizer or water). Yields are stochastic, even without any noticeable natural calamity. Random availability of production inputs or "input risk" (where human input use decisions combine with unknown natural factors) has not received as much attention as "yield risk." The latter is more a function of natural factors (although human decisions can affect the impact of natural hazards).
- 3) Price Risk due to Market Fluctuations: includes the impact of changes in agricultural input and output prices, labor costs and wages, consumption goods and services. Market fluctuations (reflected by price variability around a long-term price trend), and changes in long-term price trends are referred to as "price risk." Sources of price risk include local demand/supply shifts, regional and national demand/supply shifts, and global trade patterns. Domestic policies can have a strong influence on price risk. Historically, marketing boards and pricing policies in many SSA nations helped insulate farmers from these types of price risk. Economic liberalization allows prices to better reflect scarcity costs, but it can also be associated with increased price volatility.
- 4) Production and Market Risk due to Uncertain Resource Availability: includes the unpredictable supply of purchased inputs (e.g., the timeliness of seed and fertilizer supply). This form of uncertainty plagues many rural areas of SSA. It can be considered a source of yield or price risk (that is, uncertain resource availability can manifest itself through fluctuations in input or output quantities and prices).

5) Health Risk: includes the unpredictable impact of illnesses, communicable and non-communicable, transient and fatal. Health risks have a direct impact on productivity, lead to defensive and other expenditures, and have a non money-metric impact on welfare. These, in turn, affect asset and resource allocations and the vulnerability of households. Health risks from malaria and AIDS are widespread in SSA, and have significant negative impacts on household and social welfare.

6) Social Risk: includes risk associated with social ties and social networks. Some ties are based on egalitarian social support (e.g., extended households, mutual labor exchanges), and some are based on unequal social structures (e.g., sharecropping and usury). Many traditional social ties and networks break down as economic development occurs with its increasing de-personalization of relationships. Commercialization, privatization, decentralization, democratization, etc. all contribute to the social transformation that accompanies economic development.

7) Policy-Based and Institutional Risk: includes the impact of policies and institutions, notably markets and related systems of exchange, property-rights arrangements, and uncertainty surrounding the legal framework. Policy-based and institutional risk can exacerbate the impact of natural hazards, market fluctuations, health hazards, and social risk. Structural adjustment policies, which often change the institutional “rule s-of-the-game” (through changes in trade policies, credit policies, macro-prices, land and environment policies, etc.) can have pro-poor impacts, but often increase the degree of uncertainty, especially in the short term.

8) Political Risk: includes the unpredictable impact of armed conflicts and overall political instability, which are common in SSA. Much of the measured poverty in rural SSA is due to dislocation associated with conflict. Political stability or instability also has an important effect on households’ asset selection and allocation, and interacts with other types of risk.

It is not possible to generalize about the relative magnitudes of these risks. Individual sources of risk are often closely linked, making it difficult, in practice, to separate the effects. For example, price fluctuations (i.e., price risk) can be associated with natural hazards (yield risk), especially when the natural hazard has a broad spatial spread. Health risk, institutional risk, and political risk can lead to and exacerbate yield and price risk. Also, there is significant heterogeneity among household risk perceptions (as will be discussed in section 3), and their complex and constrained decisionmaking environment.¹¹ Furthermore, the impact of a given risk (or combination of risks) is a function of the frequency, intensity, duration and spread of the risk, and the size of the effective risk pool.

2.5 Risky Events, Outcomes and the Risk Pool

Sources of risk are characterized by probability distributions associated with the events (states of nature) and their realizations. These distributions describe the probability of an event occurring, the frequency with which it occurs, and the covariation between different events. The events themselves, such as droughts, are characterized by their intensity, duration, and geographic or social spread. Risky events with a narrow geographic or social spread are called idiosyncratic risks. Risky events with a larger geographic or social spread are called covariate.

The outcome of a risky event is conditioned upon risk management strategies, at the household,

¹¹ In a recent participatory risk mapping, households listed and ranked their perceptions of the sources of risk, their frequency of occurrence and their intensity (Smith, *et. al.*, 1999). Considerable heterogeneity of risk perceptions was found among a seemingly homogeneous group of respondents.

community and extra-community levels, made in anticipation of, and in response to, risky events. Inappropriate human actions and policies have been responsible for making risky events, such as droughts, into outcomes, such as famines that cause significant welfare losses (Ravallion, 1997). A major factor that mediates between risky events and outcomes is the “risk pool.”

The risk pool is the group that households can draw upon for assistance in managing the impacts of risk. Groups range from the household itself, a subset of households within a community, an entire community, an extended household with members in and outside the community, a group of communities, a region in a country, a country, and can also be multi-national or international. The “assistance” can be through formal or informal arrangements using a variety of instruments. In an informal insurance arrangement, the risk pool is the set of individuals (or households) that engage in the arrangement. The effective size of the risk pool depends on the nature of the risk and the transactions costs associated with drawing on the pool. Households in remote areas tend to have access to a smaller pool, because of the higher costs of transactions they face.

A major problem facing poor households is the small size of their risk pool. For example, in a remote rural community, an event or outcome that affects only a small number of households, and could be considered an idiosyncratic risk under other circumstances, might act like a covariate event due to the small size of the risk pool. The small risk pool might be a result of widespread poverty in the community or high transaction costs. The impact of covariate risk can be exacerbated by the remoteness and overall poverty of a community since more isolated and poorer communities have fewer external mechanisms to deal with risk, and internal mechanisms (e.g., social ties and networks) can easily be overwhelmed.

The size of the risk pool, together with the nature of the risk, determines the ultimate impact of the risky *event* on vulnerable households. This impact depends on the manner of households’ adjustment and the resulting outcome of the adjustment. In the case, for example, of a large covariate risk where the vulnerable have access to a very large risk pool, the outcome and impact may be minor. Such is the case with flood insurance in the United States, where the spread of the event may be wide, but the risk pool is also widespread. However, a seemingly idiosyncratic event (shock) can lead to catastrophic outcomes when the risk pool is small (due, for example, to spatial or social remoteness or isolation) or to poor to respond in a timely fashion.

The quantity and quality of participants in the risk pool are critical in determining the effectiveness of the pool (Robison and Barry, 1987; Hazell, 1992; Zeller, 1998). The larger and more heterogeneous the pool, and the greater the spatial spread, the smaller the impact of risky events and outcomes, and the lower the cost of managing risk (e.g., lower transactions costs). The heterogeneity of the risk pool is important because the pool is more effective at mediating risk if risks facing participants are not highly positively correlated. Thus, informal insurance arrangements, based on social ties and networks, might not effectively mitigate covariate risks, because many such groups depend on homogeneity as a basis for maintaining social ties and networks.

Characteristics of events described above help determine the response of households to risk and the effectiveness of different types of insurance schemes. For instance, idiosyncratic risk associated with relatively low-probability events of short duration and low intensity may be appropriately handled through informal insurance, which generally involves a relatively small risk pool. As risk increases in its geographic or social spread, informal insurance becomes less effective for addressing the risk. In such cases, formal insurance arrangements, supported by a wider risk pool, are required.

2.6 Summary

Poor and near-poor rural households face numerous risks. Risks can cause losses in household welfare. Because of their limited wealth and asset bases, poor households are more susceptible to risky events (or more vulnerable) than wealthier households. For example, poor health and nutritional status makes vulnerable households more susceptible to welfare losses associated with health risks. To counter or buffer these losses, households adopt various risk management strategies. These strategies have both actual costs and opportunity costs. Evidence shows that vulnerable households have less capacity to manage risk because they lack access to assets and have fewer risk management instruments to draw upon. A close relationship exists between the nature of risk and the size of the effective risk pool. Assets help households expand the risk pool and therefore enable them to better respond to risk. The size of the risk pool also depends on spatial isolation, nonexistence of markets, and in some cases, social exclusion. Informal insurance can be ineffective in many cases (notably covariate risk) because it tends to be characterized by a small risk pool. Vulnerable households might have different risk management objectives, and these objectives determine behavior and the effectiveness of policies.

3. RISK MANAGEMENT BY POOR AND VULNERABLE HOUSEHOLDS: AN ASSET-BASED APPROACH

Vulnerable households use a number of mechanisms in response to risk. Their risk management strategies depend on: (i) household wealth, manifested through the quantity and quality of assets in their portfolio; (ii) perceptions about risky events and outcomes and management objectives; and (iii) the set of available risk management instruments. Risk management strategies are household-specific and can change over time as conditions change.

The asset portfolio and wealth affect household responses to risky events and outcomes in a number of ways. The relationships between household asset position and the usefulness of different assets in managing risk are described first. Wealth and asset position also affect perceptions about risky events and outcomes, and attitudes towards risk. These perceptions depend on external factors, such as access to markets and the policy mix. These relationships will be explored next. Then, household objectives, which are difficult to observe, will be examined. Instruments to manage risk at the household, community and extra-community levels are discussed next. Finally, we turn to the responses of households to risk, and how these responses affect expected returns and the variability of returns, and households' ability to achieve long-term improvements in well-being.

3.1 Household Assets: Types of Assets and Their Attributes

Household assets are the stock of wealth used to generate well-being.¹² Household-owned assets and household links to community and extra-community assets are described in table 3.1. The expected income-generating value of assets and their associated variance of income are affected by the interface between risks and assets and risk management strategies at different levels.

3.1.1 Types of Assets

Assets can be tangible such as land, labor, capital, savings (i.e., natural, human, physical, and financial assets), or intangible assets such as social capital, proximity to markets and health and education facilities, and empowerment (i.e., social, location and infrastructure, and political and institutional assets). Most economic analyses focus on productive tangible assets and how they generate returns. Sociologists and anthropologists often focus on intangible assets. However, there is growing consensus that both tangible and intangible assets, and their interplay, are important, especially in the context of risk management of vulnerable households. As pointed out by Narayan and Pritchett (1997), poverty analysis that focuses exclusively on tangible household assets misses a large part of the “poverty puzzle”, by ignoring the community and social context. In table 3.1 we present a categorization of household assets, and links to assets at community and extra-community levels.¹³

3.1.2 Intangible Household Assets

Traditionally, economists have focused on the income-generating potential of tangible productive assets, such as land, labor, and physical capital. In recent years, the definitions of these tangible assets have been expanded to include both quantitative and qualitative dimensions. The concept

¹² We use the terms “income,” “returns,” and “well-being” interchangeably, while recognizing the broader concept of household assets generating a range of market and non-market goods and services.

¹³ As in the case with all of the tables presented in this paper, there is no clear-cut comprehensive and precise categorization. We present the tables as heuristic devices to help conceptualize issues.

of human capital, which includes qualitative attributes of labor, such as: health and nutritional status, skills and knowledge, have been acknowledged as important components of labor.

More attention is now being placed (see Moser and Holland, 1997; Moser, 1998) on social, institutional and political relationships among households within and outside the community (e.g., gender relations, social ties and networks, social cohesion, empowerment, participation in associations and organizations, and the effectiveness of collective action). Physical and social infrastructure complement other assets and help determine the risk and expected return of these other assets. In addition, the location (e.g., proximity or distance) of infrastructure is considered to be a critical “asset”, because it influences the availability and accessibility of goods and services.

Intangible assets have an important bearing on risk management strategies used by poor households and the design of policies that help them manage risk. In many cases, the “returns” from intangible assets can help vulnerable households survive under adverse conditions. Lack of intangible assets or “failures” of these assets to provide safety nets under adverse conditions can lead to destitution or death.

Table 3.1 Household-Level Assets and Links to Other Levels

<i>Asset Type</i>	<i>Household (HH) Level</i>	<i>Community Level</i>	<i>Extra-Community Level</i>
Natural	“Private” land, pasture, forests, fisheries, water: quality and quantity	“Common” land, pasture, forests, fisheries, water	National and Global commons, rivers and watersheds, lakes, seas, oceans, air
Human	HH composition and size Health and nutritional status Education and skills	Labor pool	Labor markets
Physical	Productive assets (tools, equipment, work animals) Household assets (e.g. housing, household goods and utensils) Stocks (e.g., livestock, food, jewelry)	Productive assets (communal and private) Stocks (e.g., livestock, food)	Productive assets (rental markets) Stocks (e.g., buffer stocks)
Financial	Cash, savings, access to credit, and insurance markets	Cash, savings, access to credit and insurance markets	Finance and insurance systems Access to international finance
Social	HH social ties and networks Intra-household dynamics	Community social ties and networks	Extra-community social ties and networks
Location and Infrastructure	Proximity and access to water and sanitation, education and health, marketplace, storage, roads	Water and sanitation, schools, health centers, marketplace, storage facilities, roads Proximity to transport and communication infrastructure	Distance to markets, transportation, communication, information systems Health and education infrastructure
Political and Institutional	Participation in household decisionmaking (including power relationships related to gender and age)	Participation in community decision-making Governance Security of person and property	Political stability Political participation Effectiveness of collective action Governance Human rights and security of person and property

Linkages between levels allow different assets to interact. Households pursue strategies to strengthen these linkages and allow them to draw on community and extra-community assets. These strategies then create cross-boundary asset pools and broaden the risk pool. Investments in political and social assets such as participation in community-level activities and decisionmaking, or gift giving strengthen these linkages. Households and communities can strengthen links to extra-community assets by participating in regional politics, marriage and migration, and through other activities. Also, linkages can be strengthened by actions at the extra-community level by various investments and policies, through open and inclusive political systems, and markets. Thus, there is a large potential asset and risk pool for households to draw upon, and contribute to. Social risk management can play a major role in creating and strengthening these linkages.

An important caveat must be made. The above list of tangible and intangible assets is rather long. In practice, the value and income generating potential of tangible assets held by poor and vulnerable households in SSA is small. In this way, the asset-based approach might actually do a disservice, by making such households seem wealthier than they really are. Rural households tend to possess small amounts of land, some unskilled labor, hand tools, a hut shelter with sleeping mats, simple cooking utensils, some stored food staples, some poor-quality clothes and shoes, and maybe some livestock, a bicycle, or a radio, but no toilet facility, running water or electricity (Alwang, *et. al.*, 1996; Carter and May, 1999). The natural asset base on which they can draw is also limited. In addition, the rural poor tend to lack community-level physical and social infrastructure, are spatially isolated, with limited political assets (especially at the extra-community level). On the other hand, poor households might have significant intangible assets such as social capital. Social capital can help increase the productivity of other assets and can also increase household well-being by itself.¹⁴ However, we must conclude that many (if not most) rural households in SSA are genuinely asset-poor, even using the broadest possible definition of assets.

3.1.3 Attributes of Household Assets

Household assets vary between the broad types detailed above. The attributes of assets discussed below help determine the usefulness of a given asset for different purposes such as income generation, store of wealth and savings, and in risk management. The attributes of a particular portfolio of assets are household specific, and the attributes of individual assets can change over time. Social risk management strategies can include policies aimed at enhancing the effectiveness of assets for household risk management.

- 1) Security of Access, Use and Transfer Rights, and Insurability of the Asset: issues concerning social and legal property rights, rules and regulations, enforcement of contracts, and physical security. In many cases vulnerable households face asset insecurity, either from the lack of appropriate institutions and legal arrangements, or discrimination based on factors such as gender, ethnic background, lack of social ties. Insecurity of land holding (lack of private ownership rights, the lack of land markets to transfer land, inheritance laws) is a particular problem. Conflict-related insecurity and fear of theft are also problems. In most cases households' assets are not insurable against losses from various risks. Lack of security and insurability increases susceptibility to risk and can lead to myopic, inefficient behaviors, such as lack of investment in asset protection, maintenance, and enhancement.

¹⁴ In addition to its function in reducing risk, social capital (used interchangeably in this paper with the term social assets) generates household utility.

- 2) Rate of Return and the Sustainability of Returns: the returns-generating potential of assets over time is conditioned by exogenous and endogenous factors. Exogenous factors include price trends for the assets and the goods and service they produce. Depreciation affects returns over time. Investments may be required to protect, maintain, and enhance the returns-generating potential (i.e., the sustainability) of the asset. For example, the rate of return on land and labor are dependent on crop prices and wages, but these assets need investments to protect, maintain and enhance their returns-generating capabilities.
- 3) Interactions of Assets in Generating Returns and Variability of Returns: individual assets are part of an asset “portfolio,” and it is important to consider how they interact. Different assets can be used alone or serve as substitutes or complements in the generation of returns. Social, location and infrastructure, and institutional assets can all complement productive assets. The variance and covariance of returns of various assets determine the asset “portfolio variance,” which is a widely used measure of risk.
- 4) Store of Wealth and Basis for Claims on other Assets or Returns: to be a good store of wealth, asset value should reflect the real value of the returns it generates, and not be vulnerable to losses in “storage” (from inflation, and other storage-related losses). Due to missing insurance and finance markets, households tend to hold assets as precautionary savings. An asset can have extra value as a claimant on other assets or returns (e.g., collateral). Livestock, for example is a fairly good store of wealth that has value as collateral, and added value as a status symbol. Social and political assets are important because they provide households with claims on other assets or returns.
- 5) Liquidity, Lumpiness and Mobility: the ease and cost with which assets are liquidated depends on their lumpiness and mobility, and the existence of markets. This attribute influences their usefulness as precautionary savings and for self-insurance and credit, and the extent of transactions costs associated with asset diversification. Market conditions (e.g., oversupply and low prices during times of distress sales of assets), and transaction costs influence the net value of the asset at any point in time, and the cost margin for repurchasing the asset. Food stocks are widely used for self-finance and credit because of their liquidity, divisibility and mobility. It is difficult and expensive to change the household’s asset portfolio with assets that are non-liquid, lumpy, and immobile, which limits resilience and efforts related to asset diversification.
- 6) Ability to Satisfy Household to Provide Basic Consumption Needs: assets that can be used for production of basic needs are valued because poor households tend to be poorly integrated into markets (e.g., land, housing, food stocks, livestock). For poor rural households, whose production and consumption decisions are often linked due to poorly functioning markets, this attribute of an asset is very important for risk management.
- 7) Externalities and/or Public Good Aspects Related to Holding or Use: the holding and use of some assets have potential externalities and public good attributes. Livestock, which often held as a store of wealth and as precautionary savings for liquidity purposes, can cause environmental damage from overgrazing. The public good and externality aspects of investments in human capital are well documented, however human capital is often drawn down (e.g., skipping meals, taking children out of school) to manage risk (Devereux, 1993; Moser, 1998).

3.2 Perceptions and Attitudes toward Risk and Household Risk Management Objectives

There is general agreement that poor households are risk averse (Anderson, *et. al.*, 1977; Barry, 1984; Robison and Barry, 1987; Alderman and Paxson, 1992; Feinerman and Finklestein, 1997). However, considerable disagreement persists about how risk perceptions (i.e., expectations) are formed and how risk aversion affects household decisionmaking. Attempts to apply decision-theoretic models adopted from the finance literature or based on risk management strategies of households in DCs with per capita incomes of about \$20,000, compared to SSA households with per capita incomes of \$200, have limited predictive applications (see below).

Decisions that seem rational by “outsiders” (based on their own subjective probabilities that might draw on objective information) will often diverge from the seemingly “irrational” decisions made by the poor based on subjective probabilities. Perceptions and attitudes toward risk of the rural poor in SSA are household specific, but some important features can be noted:

- 1) Link between Household Production and Consumption Decisions: this link is critical in defining both risk perceptions and attitudes toward risk. Because food staples constitute a large share of total consumption expenditures by the poor, and since these food staples have a low income elasticity, to protect itself against food price risk (and yield risk), the primary objective of rural households is often food self-sufficiency (Fafchamps, 1992). Concerns about food price (and yield) risk, notably fears about high food prices, are exacerbated by poorly functioning food markets. The consumption concerns of the household might thereby lead to the seemingly perverse result that they choose to produce more low-value crops. Intertemporal non-separability of consumption and production (poor nutrition in one year leads to lower productivity in the next) contributes to the dynamic inefficiency of some consumption smoothing mechanisms. For instance, if “hungry periods” of inactivity are used to smooth income variability, then lower productive potential may result in subsequent periods.
- 2) Risk Attitudes are Difficult to Infer: studies examining risk aversion among the poor tend to attribute all inefficiencies (that is, deviations from profit maximization) to risk aversion. Such practices overstate risk aversion, because multiple constraints might lead to similar inefficiencies. The examples given above lead us to question whether household risk preferences can be inferred from observed production decisions, especially when households face numerous constraints and incomplete and missing markets (Dercon and Krishnan, 1996; Holden and Binswanger, 1998). In addition, the poor have multiple objectives in management of their assets, and attributing an outcome to risk aversion is problematic.¹⁵
- 3) Poor Rural Households Face Numerous Constraints¹⁶ and Incomplete or Missing Markets: as Holden and Binswanger (1998) point out, due to subsistence constraints, lack of markets, and

¹⁵ As an example of errors that occur in estimating the private and social value of risk reduction, consider the early studies on the “value” of insurance in LDCs. Studies such as Moscardi and de Janvry (1977) and Antle (1987) estimate the deviation of observed activity (agricultural production) from levels of the activities that would result from profit maximization and attribute the entire deviation to risk aversion of decisionmakers. While such estimates may provide an upper bound to the value of insurance, several factors such as multiple constraints (see Alwang and Siegel, 1999), or different management objectives might mean that they significantly overestimate its value. If insurance were provided at amounts recommended by such studies, inefficient over-reduction of risk would result (or the insurance scheme would be oversubscribed).

¹⁶ Not all constraints are directly related to risk. Incomplete and/or missing markets can function like a constraint by limiting options and opportunities.

policies biased against poor rural households, they may be “too poor to be efficient from society’s perspective.” Wealthier households might have more risk management instruments at their disposal (e.g., collateral to obtain credit), or some households might be excluded due to discriminatory practices (e.g, female farmers tend to use fewer inputs than males in many SSA countries). This tendency may be as easily attributable to unequal access to credit markets as it is to risk aversion. The inclusion or exclusion of households from various informal insurance and credit arrangements can also affect risk attitudes (Naryan and Pritchett, 1997; Murdoch, 1999).

- 4) The Struggle for Survival Affects Household Value Systems and Risk Behavior: the struggle for survival affects households’ time horizon and discount rates. The struggle for survival also affects value systems, notably their perceptions of good and bad, legal and illegal, ethical and unethical – all of which affect perceptions and attitudes about risk and risky behavior (Moser and Holland, 1997).
- 5) Murphy’s Law and Poor Rural Households: according to Murphy’s Law, “anything that could go wrong does go wrong.” Many poor rural households, who have experienced a history of economic, political, and social factors that are repressive, demoralizing, etc. (e.g., colonialism, tribalism, heavy-handed central government). These experiences can cause economic, political, and social disenfranchisement, and a general sense of pessimism. As pointed out by Sherraden (1991, p.158): “... in situations of poverty, a large number of things go wrong. Poverty generates a sort of continual chaos. Things are always breaking down; every transaction seems to be complicated.”

More information is needed on vulnerable households’ risk perceptions and attitudes toward risk. Otherwise, risk and risk-related behaviors can be misunderstood, with implications for the design of public policies¹⁷. Economic theory alone cannot provide models that effectively predict risk-related behavior by poor rural households. Input from other behavioral scientists is needed. At the very least, economists need to recognize the complexity of household behavior when risk is taken into consideration. There is a justification for public policy interventions to achieve societal efficiency and equity objectives. To design appropriate social risk management strategies, more must be known about households’ objectives, constraints, technologies and the instruments to achieve those objectives.

3.3 Household Risk Management Objectives

Different objectives lead to different decision rules, and these decision rules affect the assessment of risk and its impact on household well-being. Household objectives are reflected in decisionmaking rules in different ways. These objectives, in turn, influence the perceived measurement of benefits and costs from household and social risk management strategies.

Below we present three broad classes of household objectives (based on Young, 1984), that can have different implications for household and social risk management strategies:

¹⁷ Take, for instance, crop diversification. Assume that it is judged that diversification into cassava, for example, is caused by risk aversion. Assume, in addition that such diversification is judged to be inefficient in the sense that potential income is lost by planting cassava. These conditions might lead the policymaker to consider some form of insurance (to move the farmers away from cassava). If, however, cassava planting is associated with inadequate household labor for other tasks, or a preference for cassava combined with cassava market failures, such an insurance program will not produce the desired results.

Risk Management Objective #1: Minimize the size of the maximum possible welfare loss. The decision rule in this case, the “min-max principle”, is to avoid the action(s) with a maximum possible loss of welfare. This decision rule does not require information on probabilities, just on the universe of loss functions.

Risk Management Objective #2: Minimize the probability of a loss in consumption below a given threshold. The decision rule is “safety-first,” that is, avoid actions that generate an expected consumption below some predetermined threshold with a given probability. With a safety-first objective, decisionmakers evaluate expected returns in terms of a probability distribution for a minimum level of income or consumption. The decisionmaker needs information on expected income from alternative activities, threshold consumption, and probability associated with risk attitude.

Risk Management Objective #3: Maximize expected returns given a fixed value of risk or variability of returns. The decision rule is to maximize expected utility model, constrained by levels of risk associated with the activities in the decision. The decisionmaker needs information on expected returns generated from the asset portfolio and variance of returns from different asset allocations.

Households might apply a combination of risk decision rules. For example, a decisionmaker can first apply satisfy-first rules to achieve a minimal expected level of consumption, and then adopt an expected utility maximizing objective (income maximization that considers expected income, variance of income, and risk preferences) and reject any actions that might result in large welfare losses.

The household’s risk management strategy depends on the availability of risk instruments and the size of the risk pool. People with access to a large and robust risk pool will move away from the first two types of decision rules, because the maximum losses, or failure to achieve the safety-first target level, will be covered through recourse to the risk pool. Different forms of informal insurance or, better termed ‘community-based risk sharing arrangements’ can, in some cases, move households toward more progressive management objectives.

Only the last risk management decision rule, which considers expected returns and the variance of returns, is directly related to modern asset-portfolio models for risk management (see section 3.6.1 for a discussion of the underlying assumptions and limitations of such models). Numerous studies that analyze risk management strategies of poor households assume that risk management objective #3 is the decision rule followed (Reardon, 1997; Ellis, 1998). If the objective of management is to maximize returns, given a level of risk (or the equivalent problem of minimizing risk subject to a given level of income), households will allocate their assets in such a way that returns are negatively correlated (or less than perfectly correlated), as opposed to a strategy of selecting assets and income that satisfy a safety threshold.

Few studies of household risk management consider the role of women and children in forming objectives and undertaking management decisions. However, since women play significant roles in household decisionmaking in SSA, this role should be understood. For instance, females are usually responsible for food staple production and decisionmaking with respect to this production is likely to be made on a safety-first basis. In addition, female-headed households face different constraints and different sources of risk, and might have different perceptions of risk. Across SSA, studies consistently find that female-headed households are more likely to be poor and vulnerable than male-headed households (Alwang, *et. al.*, 1996; World Bank, 1996; CSO, 1998).

These multiple household objectives have important implications for social risk management. The optimal social risk management strategy depends not only on the nature of the risk, but also on household objectives and perceptions of risk. It is not feasible to generalize these objectives and perceptions, especially given the diversity of social structures in SSA. It is, however, useful to recall how household objectives and risk perceptions might influence the demand for, and effectiveness of, policies and social risk management strategies.

If the main household objective is a min-max decision rule, some type of multi-peril disaster insurance would be most appropriate.¹⁸ If safety-first behavior characterizes risk-related decisionmaking, a combination of general macro-policies that enhance the functioning of input and output markets, and safety nets to supplement income/consumption shortfalls would be most appropriate. Policy should attempt to move the poor households towards portfolio-type decisionmaking by providing better access to tools for risk reduction (e.g., drought resistant varieties, weather forecasting, infrastructure), risk mitigation (e.g., insurance for insurable production, price and asset risks, labor markets), coping (e.g., safety nets, self-targeted public works) and supporting economic development strategies that emphasize asset and wealth accumulation, to enable them to increase mean incomes and reduce the consequences of risk. It is critical that policies and programs have clear, transparent, consistent and inclusive criteria to qualify for participation. In the following section we define and describe in greater detail the differences between risk reduction, mitigation and coping strategies.

3.4 Household Risk Management Strategies

Households use different management strategies in the face of risk. These strategies (summarized in table 3.2) can be broadly classified as risk reduction, mitigation, and coping. Risk management can be implemented ex-ante (actions taken before a risky event occurs) or ex-post (actions taken after a risky event occurs). Ex-ante strategies include (i) risk reduction through actions that reduce the household's susceptibility to risk, or (ii) risk mitigation through actions that moderate or offset welfare losses following realization of the event (e.g., insurance that is "purchased" ex-ante and payoffs occur ex-post, or holding of assets as precautionary savings that can be liquidated for consumption smoothing).¹⁹ Ex-post strategies are associated with risk-coping actions that deal with outcomes after they occur in a manner that moderates or offsets losses of household welfare. An example is a farmer seeking off-farm employment after experiencing crop failure.

Income smoothing can be conducted ex-ante or ex-post, while consumption smoothing is ex-post. At the beginning of any given planning horizon, the household selects its ex-ante risk management strategies and allocates its assets, while considering expected incomes and variances of income (based on subjective probabilities). Once the event is realized and the household knows the actual income generated from its assets, it must make decisions on the allocation of this income to consumption or savings. If there are shortfalls in actual income below expected income, the household can smooth income by utilizing under-employed assets (e.g., off-farm

¹⁸ In many cases, households receive assistance when disasters, such as drought or flood take place. However, such assistance is usually provided on an ad-hoc and/or untimely basis, which might not effectively help households cope with the risky event. Disaster relief needs to be "guaranteed" or provided with a high degree of certainty for vulnerable households with a min-max objective function to change their risk management strategies.

¹⁹ Insurance and credit arrangements can be formal or informal. Investments in social capital are an example of payments for informal insurance. In return the household receives a "social contract." As noted in this paper, social contracts for informal insurance and credit often break down when there is covariate risk and/or risks with high intensity or duration.

employment in response to poor harvests) or smooth consumption by decreasing savings or by dissaving. For vulnerable households, income and consumption smoothing often entail various coping strategies that require asset dissaving or low-wage employment.

A caveat must be made before proceeding in this section (and should be recalled in the remainder of the paper). In our presentation of household risk management strategies, we distinguish between ex-ante and ex-post strategies. In practice, household risk management strategies are part of a sequential planning process (Deveruex, 1993), where a combination of risk prevention, mitigation, and coping are practiced in anticipation to, and in response to, risky events and outcomes. For heuristic purposes we emphasize the ad-hoc and ex-post nature of coping strategies, in comparison to planned ex-ante risk reduction and mitigation strategies. This distinction is critical when considering static and dynamic efficiency, and equity issues, and alternative policy interventions.

Table 3.2 Ex-Ante and Ex-Post Risk Management Strategies A Sequential Process: Reduction, Mitigation, and Coping

Risk Management Strategy	Ex-Ante Action	Ex-Post Action
Reduction	Invest in measures that lower the probability or impact of a risky event	<p>If risk prevented => no action</p> <p>If risk reduced and event does not occur => no action</p> <p>If risk reduced and event occurs => possible coping to smooth consumption (depends on risk mitigation actions)</p> <p>If risk not reduced and event occurs => coping to smooth consumption</p>
Mitigation	<p>Invest in formal insurance arrangements that provides payoff (or compensation) for realizations of risky events</p> <p>Invest in formal savings or precautionary savings</p> <p>Investments in social capital</p>	<p>If risky event does not occur => no action</p> <p>If risky event occurs => receive payoff (compensation) or sell liquid assets, and possible coping to smooth consumption</p>
Coping	No specific action (i.e., investment) that helps household manage risk	Coping to smooth consumption

Ex-ante actions to reduce risk either lower the probability of an event occurring, or lessen the impact of an adverse event. An example of the first type is childhood immunization. An example of the second is adoption of drought-resistant varieties. Not all recommended risk reduction actions are successful.²⁰ In some cases risk reduction is provided as a public good (e.g., vaccinations, irrigation projects), sometimes it is a private decision without externalities (e.g., adoption of drought resistant varieties), and sometimes with positive externalities (e.g., conservation tillage that protects soil and moisture). If the risk is only reduced, and not prevented, then a risk mitigation strategy might also be adopted. Even if risk reduction and

²⁰ A potential problem exists with public -provided risk reduction. It might be viewed by households as risk prevention and crowd out private efforts to mitigate risk. Or households might adopt riskier behaviors after their risk is reduced (another example of moral hazard). These examples are discussed in more detail below.

mitigation strategies are adopted, households might still have to adopt coping strategies to smooth consumption.

Ex-ante actions to mitigate risk include formal and informal insurance arrangements that provide payoffs or compensation when a risky event occurs, and the holding of precautionary savings that can be liquidated. Asset liquidation might mitigate the negative impacts on household welfare and help smooth consumption, but households will still experience a loss in welfare due to the risky event. If the payoff or compensation is not forthcoming, as in the case of informal insurance based on investments in social capital, or if the precautionary savings are insufficient, households might have to revert to coping strategies to smooth consumption.

It is important to emphasize that household risk reduction and mitigation strategies entail actual and opportunity costs. For many households, ex-ante actual costs for risk reduction are perceived as a costly “luxury” related to possible future losses, and therefore are not a priority when allocating their scarce resources in the present. Households might instead choose actions with minimal or no actual costs, but significant opportunity costs or costs that are shifted to others. Some risk reduction investments are associated with positive externalities, notably those associated with human assets. Underinvestment in such assets can lead to private and social inefficiencies. An important aspect of social risk management is the identification of all (i.e., actual, opportunity and social) costs associated with risk management strategies. Social risk management could then use subsidies and taxes to promote socially optimal activities.

We define coping as an ad-hoc risk management strategy that households adopt without prior planning (a more detailed discussion of coping is presented in section 3.4.2). We assume that coping strategies are associated with “failures” or non-existence of social networks. We also assume that coping is associated with losses in household welfare and struggles to achieve some degree of consumption smoothing. We assume that vulnerable households will, in most cases, require assistance from sources outside their social network and probably from outside the community. This is the traditional role of social protection actions, which tend to focus on reactive “clean-up” operations as opposed to pro-active operations that can prevent or reduce the probability of a risky event or outcome, or institutionalize (formal or informal) risk mitigating arrangements.

As mentioned previously, household risk management strategies are not easily categorized into risk reduction, mitigation and coping. In fact, they can be adopted in combination or sequentially. Diversified household risk management strategies imply that policies should be designed to address different steps in the process of risk management and recognize that one strategy can spillover and affect the viability of other strategies. For example, the existence of coping mechanisms might lower the demand for risk reduction and mitigation and measures. It might also lower the effectiveness of social risk management aimed at enhancing or improving these ex-ante household strategies. In such cases, the most vulnerable households might choose not to participate in risk management schemes because they can not or choose not to shoulder the ex-ante actual costs. Subsidies or other means of promoting participation might be urged.

3.4.1 Income vs. Consumption Smoothing

In recent years there has been a great deal of interest in consumption smoothing behavior of poor households (see Deaton 1991; Alderman and Paxson, 1992; Besley, 1995; Murdoch, 1995; Townsend, 1995; and Deaton, 1997 for reviews). Three central issues surround this interest: (i) are poor households able to smooth consumption in the face of variable incomes?; (ii) how does the ability to smooth consumption affect the demand for insurance?; and, (iii) is consumption

smoothing an “efficient” form of insurance against income risk? There are relatively good answers in the literature to the first two questions, but less is known about the third.

Income smoothing is in most cases an ex-ante risk reduction strategy. Consumption smoothing is an ex-post strategy that encompasses risk mitigating and coping activities (Morduch, 1995). Income smoothing consists of household actions that change the asset base or change the mix of income-generating activities from a given asset base. Reallocations occur among assets whose returns are less than perfectly correlated, or into assets with less variable returns (see below, in the context of diversification). These allocations have efficiency and equity implications. Households smooth consumption by using formal and/or informal insurance or finance, depleting assets, and changing the mix of income generating activities from assets. According to Morduch (1995, pp.104): “One cannot simply look at the smoothness of consumption and know which type of smoothing mechanism is at work. Indeed, the two types can act as substitutes for each other.”

If consumption can be effectively smoothed at “reasonable” costs, then returns to income smoothing insurance are likely to be lower (that is, households who can effectively smooth consumption will have lower demands for income-smoothing insurance). Likewise, studies that estimate the value of income risk reduction to households are likely to overestimate the value of insurance if they ignore the possibility of effective consumption smoothing. Several studies (e.g. Binswanger and Rosenzweig, 1989; Rosenzweig and Wolpin, 1993; Townsend, 1995) find that because even the poor are able to smooth consumption, demands for actuarially fair insurance are lower than they might be without such smoothing.

Coping strategies and the enthusiasm for such strategies among academics and development practitioners need to be put in perspective. Poor households should be commended for their ability to survive under difficult conditions, however, policies and programs should not necessarily be structured to support and promote coping behaviors. Households that resort to ad-hoc coping strategies do so out of desperation – due to multiple constraints – inevitably leading to losses in social welfare. Coping (e.g., distress sales of assets, acceptance of low-wage labor) can also exacerbate inequality. Such coping strategies may lead to more certain income and consumption levels, but the levels are usually very low and unlikely to provide surpluses for investments. In addition, coping strategies often place heavier burdens on women and children (see box 1 for an example).

Poor households often cope by reducing consumption, removing children from schools, and seeking off-farm employment (at low wages). Following observations of such behavior, some studies conclude that an appropriate policy is needed to assist vulnerable households in this “diversification process”, by promoting traditional cropping and nutritional systems. However, support of coping behavior can keep poor households locked in the vicious cycle of poverty. Policies and programs should seek to alleviate the multiple constraints (e.g., lack of credit, poorly functioning input markets) so that poor households can obtain higher returns to labor on and off their land. Policies should focus on increasing the returns to assets of vulnerable households, increasing the amount of assets they hold, or both.

Box 1: Withdrawing children from school as a coping strategy

In Zimbabwe, withdrawal of children in times of household financial crisis is widely practiced as a coping strategy among poor households. By doing so, school fees and other outlays are saved, and the children can be put to work to generate cash. There is a strong relationship between use of this practice and the poverty status of the household. For instance, the rural poor are much more likely to withdraw their children from school during January and February, times of peak demand for on-farm labor. At the same time, there is a strong relationship between educational attainment and poverty. The poverty headcount index among households headed by someone with secondary school education is $\frac{1}{2}$ the level of households headed by someone with no education or only primary education. By withdrawing their children from school, poor Zimbabwean families perpetuate a poverty trap, whereby short-term cash needs are met at the expense of long-term investments in human assets.

Source: CSO, 1998.

3.4.2 Welfare Implications of Consumption Smoothing and Coping

Studies that examine household responses to risk in SSA tend to focus on the effectiveness of risk mitigation and coping strategies in reducing welfare losses due to variable income (Ellis, 1998). For instance, several studies examine the effectiveness of smoothing mechanisms in reducing the variance of the outcome, either income or consumption (e.g., Deaton, 1991; Paxson, 1992). More recently, there has been a shift toward looking at household risk management from the perspective of opportunity costs. That is, does risk lead households to outcomes that keep them from being efficient and reaching their production possibilities frontier? There is no known study that quantifies the dynamic efficiency of risk management strategies. Furthermore, no study quantifies the role of risk in terms of dynamic efficiency while explicitly considering the multiple objectives of households and the role of resource allocation in achieving these objectives. For example, investments in social capital, such as labor sharing during times of need, have payoffs beyond simply providing insurance. Labor sharing may reduce the transaction costs of hiring labor, or provide “down payments” on other claims or on extra-household assets. On the other hand, investments in social capital yield returns to household objectives other than risk management, such as social acceptance, status, etc.

Concern exists that poor people may have less ability to smooth consumption and that this inability may lead to behavior such as shifting to less risky portfolios that exacerbates income inequality (e.g. Binswanger and Rosenzweig, 1993; Carter, 1992). Binswanger and Rosenzweig (1993) show that poorer households pursue portfolio strategies that concentrate in lower risk/lower return assets, which may lead to a poverty trap. They pursue these strategies because they have more limited consumption smoothing possibilities. The authors find that the relative share of farm profits going to risk reduction or mitigation increases as incomes decline. The poorest and most vulnerable households, thus, tend to “pay” relatively more for insurance. Other studies generally find high costs of consumption smoothing for the poor. Fixed costs of transactions might make the per unit transaction price higher for poor households (Zimmerman and Carter, 1996). In either case, efforts of poor households to smooth consumption can exacerbate income inequality, as poor households, in effect, pay more for their insurance in terms of actual and opportunity costs. As pointed out previously, other social costs (e.g., environmental impacts) can be associated with households’ attempts to provide their own insurance.

3.5 Instruments Available to Households to Manage Risk

Households have several instruments to manage risk. In table 3.3 we categorize different instruments at the household, community, and extra-community levels according to their use for risk management. In practice options might be limited. The availability of risk management instruments and their impact on efficiency and equity, are linked to socio-economic conditions, policies, insurance and financial systems, physical and social infrastructure.

Table 3.3 Instruments Available to Households to Manage Risk²¹

	Household Level	Community Level	Extra-Community Level
Risk Reduction			
	Investment to protect, maintain and enhance assets Adopt new technology Adjust asset portfolio and income-generating activities Permanent migration	Investments in physical and social infrastructure Social ties and network Participation in community institutions and decision-making Rules and regulations Rights and security	Information on risk and risk reduction Rules and regulations Guaranteed rights and security Stable macro-economy, policy regime, and political system Open and free markets Responsive institutions Investments in public goods, physical and social infrastructure
Risk Mitigation			
Asset portfolio Management	Adjust asset portfolio and income-generating activities Hold financial or non-financial assets (e.g., livestock, food stocks) for precautionary savings Seasonal migration	Markets for household assets Physical and social infrastructure	Markets for household assets Market information Investments in physical and social infrastructure
Insurance	Formal insurance Informal insurance based on intra-household social capital claims Inter-linked contracts	Informal insurance based on community social capital claims Formal community insurance pooling associations	Formal insurance, private and public sector, and international organizations (e.g., crop insurance, health insurance) Disaster aid funds
Finance	Formal and informal credit Inter-linked contracts	Community credit unions and savings clubs, and “banks” for other asset stocks	Financial systems, national and international Inter-community credit associations and “banks” for other stocks
Risk Coping			
	Draw down assets (e.g., skip meals, mine soil, not pay school fees) Use underemployed assets (e.g., off-farm employment, child labor) Sell assets Encroach on assets of others Illegal activities Formal and informal credit Depend on charity	Draw down community assets (e.g., reduce maintenance, harvest or mine natural resources) Depend on charity or aid from outside community	Targeted safety nets (transfers, public works) Social investment projects (e.g., social funds) Depend on charity or aid from national or international organizations International food aid Donor assistance

²¹ This table generalizes and expands upon Holzmann and Jorgensen (1999), Bendokat and Tovo (1999), and World Bank (1999).

3.6 Household Risk Management Techniques

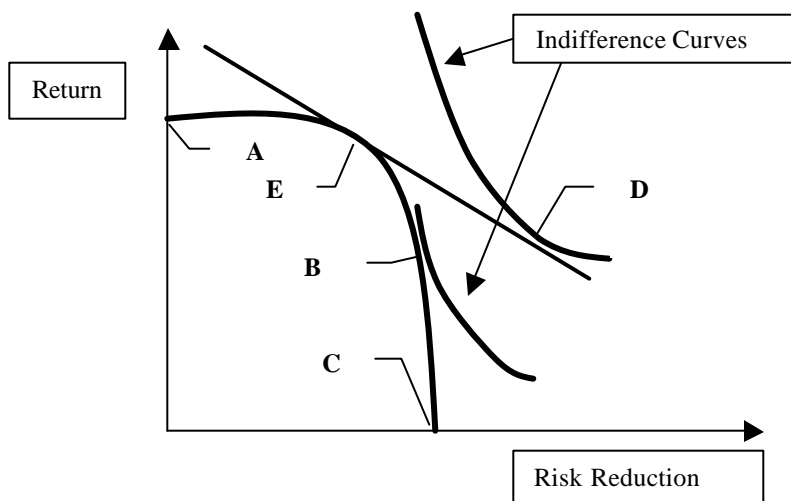
In the previous section we listed the major risk management instruments. In this section we will detail, using an asset-based framework, techniques households use to manage risk. We examine how households adjust their asset base to manage risk. Households might allocate their assets to pursue objectives other than risk management, but these strategies also have implications for risk management.

3.6.1 Asset Diversification

Assets and risk are closely linked because risk is transmitted through the household's asset portfolio, and assets are allocated to manage risk (and to achieve other objectives). This asset allocation is called diversification. Diversification is often cited as the primary household response to risk (Reardon, 1997; Ellis, 1998). In the context of risk management, diversification is a useful concept because finance theory uses the term diversification to describe allocations of assets in the pursuit of an objective (usually maximization of returns), subject to a given level of risk (variance of returns). According to finance theory, diversification leads to a tradeoff between the expected value of the returns (E) and the variance of the returns (V). This tradeoff is used to construct an E-V frontier (see figure 1).

However, there are misconceptions about the meaning and use of the term diversification (Siegel, *et. al.*, 1993, Siegel, *et. al.*, 1995b). Much of the confusion results from attempts to draw parallels from the finance literature, which is not exactly appropriate in the case of non-financial assets. To complicate matters, economic development literature uses the term diversification to define the process of structural transformation of the economy. Popular use of the term diversification tends to simply mean either changing or increasing the number of assets or activities. In this section we clarify some of the confusion.

Figure 1. E-V Frontier



Basic finance theory is used to describe the return-risk (E-V) tradeoff and explain the financial context of asset diversification. The goal of this discussion is to illustrate the relationship between assets, risk, household objectives and risk management strategies. Differences between the allocation of financial assets and the allocation of physical assets are discussed. Formal and

informal means of managing risk and their impact on returns and risk are described using this illustration. Different forms of asset diversification are then detailed, together with their effectiveness in generating returns and reducing risk.

According to finance theory, risk is associated with the variance of returns, and an asset portfolio is selected to minimize variance subject to a given level of returns and covariances of assets. A typical expected E-V tradeoff is shown in figure 1. The AEBC locus is the E-V frontier, representing the outer (i.e., efficient) envelope of returns and risk-reduction tradeoffs for a given asset base. The indifference curves represent the decisionmaker's preferences toward the E-V tradeoffs. Several points need to be made:

- 1) The E-V frontier represents different allocations of a given set of assets, given exogenous conditions such as the rates and the variance of returns. The E-V frontier is determined by exogenous and endogenous conditions. For example, improved management skills (investment in human assets) can cause outward shifts in the E-V frontier. Also, for households, various constraints can also influence the shape and position of the E-V frontier.
- 2) The concave shape of the E-V frontier is based on finance theory (that is, higher risk is the "price" paid for higher returns). In finance theory, non-concave portions of the E-V frontier are eliminated from consideration by using a linear combination of higher return-lower risk assets. However, other possibilities of E-V combinations (such as increasing returns and decreasing risk) exist for non-financial assets (these possibilities are discussed later and presented in table 3.4).
- 3) Financial theory assumes assets are mobile, fungible and substitutable. Asset diversification is assumed to occur with minimal time lags or transactions costs. Unlike the case of financial assets, physical assets are not necessarily fungible and substitutable, and diversification can entail significant time lags and transactions costs. These costs need to be considered when evaluating a strategy of diversification. These costs are implicitly imbedded in figure 1 (that is, the E-V frontier should include asset portfolio adjustment costs, which influence its shape and location), but are often ignored. The lack of fungibility or higher transactions costs shift the E-V frontier toward the origin.
- 4) Financial theory assumes that assets are characterized by constant returns to scale. However, because of indivisibilities, there is a potential for increasing returns. Economies of scale in production create incentives to specialize.
- 5) Households diversify their portfolio of assets with different objectives in mind, one of which may be stability of returns. Financial theory presupposes that risk reduction (lower variance of returns) is the decisionmaker's primary objective. The returns-risk reduction tradeoff for decisionmakers is represented by the indifference curve, which will be different for different households. If households are operating according to risk management objectives #1 and #2 in section 3.3, then an E-V analysis will have little relevance. The E-V analysis is only relevant for risk management objective #3.
- 6) The E-V tradeoff is static. To incorporate time, we must include savings and investment behavior. The outcome of savings and investment shifts the E-V frontier through time and this investment is determined by intertemporal preferences. At low levels of risk and return (toward point C in figure 1), savings and investment are likely to be small or even negative. Savings should shift the frontier upward, but will also (through wealth effects) change the shape and location of the indifference curve.
- 7) Different forms of insurance allow the decisionmaker to move to a higher indifference curve. This movement is shown using the sloped line in figure 1. Given household risk preferences and available technologies, the decisionmaker will choose to produce at point B in the absence of insurance. Insurance, whose cost per unit of risk reduction is represented by the slope of the line tangent to point E, allows the decisionmaker to move to the higher level of utility,

represented by the tangency at point D. The decisionmaker selects an asset portfolio to produce at point E (higher returns and lower risk than point B), but purchases insurance, which allows him or her to move to point D, which indicates a preference for more stability and lower returns.

- 8) The E-V analysis treats the household as a single unit. Diversification might imply different impacts on different household members based on gender or age. For example, livestock herding is often a boy's responsibility and investments in livestock can lead to school absence or withdrawal. Female household members have specific responsibilities (e.g., staple food production, food preparation, child care, water and fuelwood provision, laundry) with considerable time requirements. Most of these tasks are non-monetized, but affect household welfare. Asset diversification will inevitably have direct or indirect impacts on demands for the labor of different household members.
- 9) The E-V analysis does not consider asset depletion and externalities. Poor or near poor households with a short planning horizon, can not usually "afford" to sacrifice short-term returns for lower risk by adopting soil conserving cropping practices. Asset depletion causes an inward shift in the household's E-V frontier; externalities cause a shift in the societal E-V frontier.

The points discussed above along with figure 1 and table 3.4 provide a framework for considering the relationship between insurance, risk reduction, static and dynamic efficiency and social welfare. Different mechanisms for addressing risk can be treated within this framework, with diversification being one of them. The framework can also be used to evaluate changes in household vulnerability (discussed in section 2.3), by characterizing the tradeoffs between expected returns and the variance of returns, and E-V outcomes relative to the poverty line.

Table 3.4 Diversification: Expected Returns/Variance of Returns (A Single -Period Analysis)

	Lower Instability of Returns (V-)	Higher Instability of Returns (V+)
Higher Expected Returns (E+) <i>Also associated with increasing the overall asset base, and/or increasing rates of returns</i>	E+, V- (win-win) "I" Higher expected returns and lower instability Associated with technology adoption (e.g., irrigation) and human assets (e.g., improved management) Associated with specialization	E+, V+ (tradeoff) as in figure 1 "II" Higher expected returns and higher instability Associated with technology adoption, higher yields and higher input use Associated with specialization
Lower Expected Returns (E-) <i>Also associated with decreasing the overall asset base, and/or declining rates of returns</i>	E -, V- (tradeoff) as in figure 1 "III" Lower returns and lower instability Associated with risk spreading activities (e.g., drought resistant varieties) and conservation practices for natural assets Associated with precautionary savings (e.g., holding of assets that can be easily liquidated)	E-, V+ (lose-lose) "IV" Lower returns and higher instability Not by choice, but could result from changes in returns on assets and changing patterns of fluctuations (e.g., declining price trends, changing covariance of prices, changing yields) and/or multiple constraints

Households adjust their asset portfolio with different objectives in mind, and subject to available technologies, exogenous prices, infrastructure, social and political conditions and various endogenous and exogenous resource and market constraints. The diversification strategies can lead to increased returns and lower instability, lower returns and lower instability, higher returns

and higher instability, and even lower returns and higher instability of returns (which clearly is not a rational household choice). These possible outcomes are presented in Table 3.4.

Subject to numerous constraints and adverse conditions, households might have no choice but to select an asset portfolio that results in decreased returns and increased risk (lose-lose situation). In other cases, they choose between asset portfolios that result in E-V tradeoffs (i.e., movements along the E-V frontier where there are lower returns and lower risk, and higher returns and higher risk) or try to select a win-win situation whereby returns increase and risk declines. Thus, only quadrants II and III in table 3.4 imply movements along the E-V frontier (assuming that the households are actually operating on the frontier), whereas quadrants I and IV imply movements of the E-V frontier (quadrant I outwards and quadrant IV inwards).

3.6.2 Diversification of Income -Generating Activities

The most widely used forms of diversification of income-generating activities to reduce income risk are enterprise diversification (planting different crops and inter-cropping), spatial diversification (plantings in different fields), temporal diversification (staggered plantings), and varietal diversification (e.g., use of drought-resistant varieties). For households with limited land, this means low returns to land relative to wealthier farmers who prefer larger amalgamated plots and crop specialization.²² Other forms of diversification include input diversification (using low-risk inputs), market diversification (alternative sources for purchasing inputs and selling outputs), and vertical integration (own-production of inputs and own-processing of outputs). The latter types of diversification are responses to uncertain resource availability.

Households also allocate their labor in a manner than can mitigate risk. These allocations include engaging in small businesses (agriculture-related or non-agricultural enterprises), off-farm employment, and seasonal migration arrangements. Households in SSA practice a wide variety of strategies to diversify incomes as a means of insurance. Reardon, *et. al.* (1988) document the practices of poorer households in Burkina Faso to spread income risks across occupations and across space.

In general, these diversification strategies can be effective at lowering risk, but are also associated with lower returns and significant costs. On the other hand, they might be efficient second-best asset allocations given the multiple constraints households face. More productive assets or increases in the asset base, along with better insurance and finance, input and output markets could allow households to allocate their assets to higher income-generating activities. Thus, it is important to identify policies and investments to assist households manage their risk and achieve a more efficient allocation of assets, and increase expected returns.

3.6.3 Investments in Natural, Human, Physical and Financial Assets

Households invest in natural, human, and physical assets for several reasons. Investments in these assets can be used to maintain or increase returns and/or decrease risk (movements of or along the E-V frontier). Due to the lack of insurance and finance markets, investments in these assets often serve as mechanisms for self insurance, savings and credit. The attributes of the different assets (see section 3.1.2), notably their ability to generate returns, serve household consumption needs, and provide liquid reserves, determine their usefulness for income and

²² Land-poor households, especially those facing food security, market and credit constraints, tend to be more diversified in terms of cropping activities (Fafchamps, 1992; Alwang, *et. al.*, 1996; Alwang and Siegel, 1999).

consumption smoothing. Some assets, such as livestock and land, increase status and prestige in addition to their returns-generating and insurance/savings functions.

Ideally, to improve dynamic efficiency and equity, investments by poor households in these assets would move the E-V frontier outwards. But, poor households are often “forced” to use these assets for risk management, and they can be inefficient forms of self-insurance and savings (based on their actual and opportunity costs). In cases of covariate risk, asset prices tend to fall as demand shifts inward and many sellers flood the market with distress sales during widespread shocks. This phenomena of asset price endogeneity limits these assets’ value as insurance. Transaction costs during sales of physical assets can also be high, and in many cases it is difficult for the buyer to observe the quality of the asset. These drives wedges between the emergency selling price and the repurchase price, limits the value of such assets as insurance, and ensures that when such insurance is relied upon, there are high costs in terms of dynamic efficiency. This is closely tied to the dynamic equity impacts. In times of lower asset prices, it is usually the wealthier households that purchase the assets, and they purchase under-priced assets and/or resell the assets at higher prices. Either way, poor households lose and wealthier households gain, increasing asset and income inequality (de Janvry and Sadoulet, 1996; Zimmerman and Carter, 1996).

3.6.3.1 Investments in Natural Assets

Land is a valuable asset, but in many cases its usefulness in risk management is limited by the lack of secure private property rights and land markets. A primary means of generating returns, land also provides basic needs such as food and shelter, and provides claims to social capital, infrastructure, and political and institutional assets. However, land is not mobile, and, in most cases (under existing circumstances in many SSA countries), it is not a good store of wealth for poor households.

Natural assets can be depleted (e.g, soil fertility losses, over-harvesting of woodlands and water sources), and their returns-generating potential diminished. But land has the potential to be resilient if investments are undertaken. In practice, however, poor households often forego investments in the protection, maintenance and enhancement of their natural assets, because they are consumption and investment poor (Reardon and Vosti, 1996). In addition, in order to smooth consumption, vulnerable households often resort to environmentally damaging coping strategies related to common natural assets (e.g., mining or overharvesting of land, forests, water, wildlife). Thus, there are externality issues associated with natural assets, at the household, community and extra-community levels. Although legal arrangements might exist to protect natural assets, enforcement is often lacking, and vulnerable households are often left with no alternatives but to engage in “illegal” practices.

Social risk management strategies aimed at helping vulnerable manage their natural assets and to protect and maintain common assets can help prevent negative externalities. It is important, however, that the complex relationship between household behavior and environmental degradation be taken into account. Vulnerable households need alternative means to increase returns and lower risk, and appropriate incentives and institutional arrangements to protect and maintain natural assets, and especially to enhance their productivity. For example, self-targeted projects that pay or subsidize vulnerable households for adopting soil conservation practices can lead to increased returns and lower risk over time.

3.6.3.2 Investments in Human Assets

Human assets benefit from protection (e.g., preventative health practices, water and sanitation related infrastructure), maintenance (e.g., good nutrition and health care throughout the year, leisure), and enhancement (e.g., education and training). The idea that investments in human capital are necessary for promoting broad based economic growth is well accepted by most development professionals. The literature on endogenous growth (e.g., Romer, 1986; Lucas, 1988) stresses this importance. Investments in human capital from infant and child feeding to education represent informal household savings, but represent growth rather than level effects to the economy as a whole²³. In addition to their impacts on expected household well-being, investments in human capital are a means of managing health and other risks. First, higher levels of human capital (especially management skills) reduce transaction costs associated with reallocation of the asset portfolio. They also lead to higher returns on existing assets. Second, investments in human capital can reduce the susceptibility to risk. Better-nourished and better-educated children are less likely to become ill; higher-skilled workers are less likely to lose their jobs. Third, investments in human capital can change risk preferences and subjective appraisals of risk. Fourth, investments in human capital can be viewed as a form of precautionary savings that can help smooth consumption.

Thus, household investments in human capital increase the flexibility with which labor can be used, enhance the ability to assess and manage risk, and increase returns to other assets. Investments in health and nutrition lower risk directly and also indirectly via their impact on productivity and income. Education, good health and good nutrition create synergisms that help raise the productivity of all assets. Investments in human capital also increase well-being in a qualitative sense. Education and health are clear examples of goods that provide benefits that are external to the household. Because all society benefits from having well-educated and healthy citizens, there is a clear role for public interventions in education (i.e., there is an economic efficiency argument in favor of subsidized education).

Human capital investments and risk interact in a number of ways. At a basic level, household formation and the birth of children represent a response to risk. The decision to have children is partly motivated by a desire to insure oneself during old age. Fertility rates respond clearly to risk of survival, and in cases where AIDS deaths among young children are likely, more children are likely to be born. Life-cycle additions and deletions (taking in extended family members), etc. occur in response to risk. Some of these represent “planned” risk management (e.g., taking in elderly relatives), and some are “unplanned” (e.g., taking in siblings of HIV-afflicted relatives). Social risk management is thus likely to have a strong impact on household structure, demographics and population growth.

Human capital can be an effective form of precautionary savings that can be used for consumption smoothing. Skipping meals and changing labor allocations are widely used practices of risk management. This implies that households hold an “excess” stock of human capital. In this context, human capital can be resilient, if minimal nutritional and health thresholds are not violated, and if there are subsequent investments in “re-stocking” the human capital through higher food intake and rest. The cyclical nature of labor demands and the existence of “surplus labor” reinforce this phenomenon. Social risk management strategies need to consider the seasonal management of human capital when planning interventions such as

²³ Lucas (1988) distinguishes between savings, which increases the level of well-being without affecting its rate of growth, and technical change, which leads to increased growth. Investments in human capital clearly fall into the latter category.

public works programs during non-peak labor demand periods, because they might conflict with the “re-stocking” of households’ human capital.

Risk is also born differently by different household members. The burden of risk tends to fall disproportionately on females and children. As a coping strategy, children are often withdrawn from school and sent to work at low wages. Other coping mechanisms such as fuelwood harvesting and sales often require contributions of children. The work burden for women increases with stress as they are often expected to seek additional work, yet their duties at home are not lessened. Risk thus imposes an inordinate burden on women and children. Risk management efforts can have subtle effects on the balance between risk management and equity. Some efforts might shift the burden of risk management and improve equity within vulnerable households. Investments in female education, for example, raise their productivity, and can increase their participation and empowerment in risk management practices. Other paths are more difficult to disentangle. If investments in children’s health and education are viewed by households as a means of managing risk, risk reduction efforts might create disincentives to making such investments. Also, if social security is being considered, it should occur simultaneously with increased focus on and subsidies for children’s education. Social risk management programs should be broadly focused and recognize these different roles of human capital and intra-household dynamics and consider the possibility of unintended consequences.

3.6.3.3 Investments in Physical Assets

Physical assets can be broadly classified as productive assets (e.g., tools and equipment, livestock), household assets (e.g., housing, household utensils and furnishings, clothing, radio, bicycle, jewelry), and stocks (e.g., stored food). The division between these groupings is not clear-cut. Livestock, such as cattle, can be used as work animals and for transport, and also serve as stocks that can be liquidated. Bicycles and radios are important sources of transportation and communication and can also be used for non-productive purposes. Housing generates imputed income and can generate actual income when space is rented or provides a site for household businesses. Housing and household goods are also crucial in determining household size and composition, which is a major determinant of household income-generating potential and risk management strategies.

The most common form of asset diversification for risk management is the holding of stocks, notably livestock and food (Binswanger and Rosenzweig, 1993; Devereux, 1993; Reardon and Vosti, 1995; Dercon 1996; Carter and May, 1999). These assets have the advantage of being fairly liquid, and can be consumed or sold to smooth consumption. Livestock can be a good store of value, and can be used for agricultural production and transport, and have other economic and social value.²⁴ Food stocks are low-return assets that are susceptible to depreciation (storage losses of 10-30% are reported), and actions to improve storage conditions are needed. In West Africa, jewelry is also widely used as a means of precautionary savings, in addition to livestock and food stocks (Udry, 1995).

Other physical assets can be used for risk management, however there is a great reluctance by poor households to sell tools, equipment, radios, or bicycles. In fact, many poor households

²⁴ Although livestock has been found to be a popular means of precautionary savings, usually wealthier households only can afford to hold large livestock, such as cattle. If precautionary savings are to continue to be an important household risk management strategy, it is important to assist poor households to invest in small livestock, such as poultry. These require less investment and upkeep costs and are more liquid than cattle.

prefer to draw down human capital instead of selling physical assets, because of their high utility and difficulties related to replacement (Davies, 1993). Also, sales of clothing and household furnishings are only undertaken under times of extreme stress.

Precautionary savings can be an effective means of smoothing consumption when formal insurance and finance markets do not exist (Lim and Townsend, 1994). However, as mentioned above, there are problems associated with endogenous price risk, and precautionary savings have costs that might cause inefficiencies. In addition, the use of livestock for risk may lead to inefficient over-investments in livestock and subsequent negative impacts on natural assets through overgrazing (Reardon and Vosti, 1995). If “excess” demand for livestock is based on its role for risk management, then externalities (i.e., social cost) associated with such demand should be accounted for when comparing it to the private cost of insurance.

3.6.3.4 Financial Assets

A major priority of financial system reform in rural areas is savings mobilization. This reform entails the physical establishment of financial institutions and policy reforms that guarantee positive real interest rates, deposit insurance, and, in general, increased confidence in financial institutions (Yaron, *et al.*, 1997). Considerable attention is being placed on the promotion of decentralized financial institutions. Decentralized savings institutions can improve accessibility and reduce transaction costs. In some case, special savings institutions, and legal protection is needed to encourage savings by females.

Box 2: Livestock Ownership as Informal Insurance and Finance

Livestock ownership is an example of portfolio diversification as a form of informal insurance. Livestock, however, is not a perfect means of reducing risk. Holdings are not fully liquid and ownership of livestock fulfills a number of non-insurance objectives. Fafchamps, *et al.* (1998) show that livestock transactions play a less-significant role in consumption smoothing than is often assumed. In West Africa, in contrast to India (see Jodha, 1978, and Rosenzweig and Wolpin, 1993) where livestock sales are almost exclusively used to smooth consumption, livestock sales compensate for at most 30 percent and probably closer to 15 percent of income shortfalls (Fafchamps, *et al.*, 1998). This recent evidence (from Burkina Faso) conflicts slightly with other evidence from West Africa, where livestock sales are found to buffer consumption (Swinton, 1988).

Rosenzweig and Wolpin (1993) argue that investments in bullocks in South India help increase productivity and smooth consumption. Considerable underinvestments in bullocks exist because aversion to risk (asset price risk) combined with borrowing constraints and low incomes result in output losses and lower incomes. Accumulation of cattle is impeded by weather shocks when there are borrowing constraints. Farmers sell productive assets to meet consumption needs. Thus, risk aversion leads to a poverty trap, and some public intervention might be necessary to “push” the system to another equilibrium. The authors suggest intervening in credit markets to make consumption credit more widely available.

3.6.4. Investments in Social, Locational, Political and Institutional Assets

Intangible assets have an important role in generating returns and in risk management. Social, locational and infrastructural, political and institutional assets can have a major impact on the access, availability, and cost of various risk instruments and on the expected returns and variability of returns from tangible assets.

3.6.4.1 Investments in Social Assets

Social assets (or social capital), a household's intra- and extra-household social ties and networks, can provide a form of informal insurance. That is, social capital defines the risk pool upon which the household can draw to mitigate risk.²⁵ In most cases the risk pool associated with social capital is limited to the community, but some extra-community links exist, based on migration (see section 3.6.5), charitable organizations and religious groups, and international organizations and governments that feel a kinship or bond, and feel, to some extent, mutual responsibility.²⁶

We consider investments in social capital as an ex-ante risk mitigation strategy. Households invest in social capital in a manner similar to investments in physical assets as precautionary savings (and for similar reasons). Like investments in livestock, investments in social capital serve several household objectives, one of which is risk management. Households invest in social capital in different ways, for example, by gift-giving, participation in ceremonies, through labor sharing, and "lobbying" to make others feel some sense of responsibility.²⁷ In return, households receive compensation payments (e.g., cash and in-kind assistance) in times of need. Like other investments in precautionary savings, there are associated costs and a potential for inefficiencies incumbent with over- or under-investment for risk management purposes.

Social capital can be an effective means to mitigate household-specific idiosyncratic risk. However, like other forms of informal insurance, social capital-based insurance tends to fail under covariate risk or in the presence of strong or repeated shocks. Even, however, in a riskless world (e.g. if a perfect insurance scheme were created), investments in social capital are likely to occur because social capital fulfills household objectives in addition to risk reduction. For example social status and cohesion are important determinants of household well-being.

Besides its limited effectiveness in dealing with covariate risk, the effectiveness of social capital is limited by its very nature – that is, it is based on selective membership criteria. Social ties and networks might function well for the "insiders," but vulnerable households might be excluded from membership. We need to be careful to distinguish the relationship between inclusion and exclusion in social networks and vulnerability. Thus, we need to answer the questions: "Are vulnerable households vulnerable because have been excluded from social networks?", or "Are vulnerable households excluded from social networks because they are vulnerable (and perceived to a drain on the group)? In-migrants to communities, individuals that do not accept traditional customs (e.g., females that refuse to undergo circumcision, where this is still an accepted practice), elderly and infirm might be excluded from social networks. Some development practitioners have lauded the existence of social networks and their ability to help members manage risk. Social risk management strategies aimed at strengthening social capital and informal insurance "contracts" need to be carefully designed so that they do not reinforce exclusionary social networks based on discriminatory criteria. As such, in some cases, social risk management strategies should actually be designed to intentionally crowd-out some discriminatory informal insurance mechanisms.

²⁵ Investments in social capital are made before the occurrence of risky events and provide members of the social network a "social contract" that entitles them to insurance in times of need. This type of risk spreading has limited effectiveness, because the "social contract" can be broken in times when covariate risk simultaneously impacts several members of the risk pool.

²⁶ Organizations such as the United Nations, the World Bank, and donor governments are examples of social ties outside the community. Links to these groups are more likely to be at the community, regional or nation level, rather than the household level, but households can and do draw on these social assets.

²⁷ Through interviews and photo-ops with CNN, for example, and the written press, vulnerable households in LDCs make appeals for assistance, and try to expand their risk pool beyond community borders.

3.6.4.2 Investments in Political and Institutional Assets

Political and institutional capital are closely related to social capital, in that they deal with intra- and inter-household relationships related to participation and empowerment. They also include rules and regulations that protect property and human rights, and personal and material security, etc. The rights of women, children and minorities, for example, have an important impact on household well-being and the ability to manage risk.

The existence of well-defined “rules-of-the-game” and their enforcement are critical to households’ management of their asset base. Stable and effective governance, in and of itself, can help reduce the susceptibility of households to risk, change perceptions of risk and objectives of risk management, and help households manage. Also, expected returns from a given set of assets might increase and the variability of returns might decrease due to good governance. In addition, increased confidence in institutions should provide a greater incentive for households to invest in productive assets.

Household investments in political and institutional assets include political action, and participation in decisionmaking. Clearly, such investments are made with risk management and other objectives in mind. In fact, other objectives might outweigh risk management considerations.

Once again we raise the question of causality – is vulnerability a function of the lack of political and institutional assets or is the lack of such assets the cause of vulnerability. As in the case with social capital, there are probably very close linkages that are hard to disentangle. Unlike social capital, however, we define political and institutional assets as the set of “universal rights” to which all are entitled. Voluntary social networks are just that, and despite any external efforts, they will determine their own membership criteria (either formally or informally). In contrast, political and institutional assets should be “mandatory”, in that no individual or household can be excluded. Thus, social risk management has a critical role in guaranteeing political and institutional assets to ALL households and ALL household members, with a focus on empowering vulnerable households and household members that might be poor in such assets.

3.6.5 Migration as a Form of Asset Diversification

Migration can be considered a form of asset diversification that is used, among other things, to manage risk. Permanent migration (when a household member(s) migrates and sends back remittances) can change the expected returns and variability of returns to human assets, and it represents the spatial and sectoral diversification of human assets. Seasonal migration represents a short-term effort at consumption smoothing, and is a widespread means of risk mitigation and coping.²⁸

Permanent migration occurs for a number of reasons, but is often motivated by a desire to increase returns and lower the variability of returns to investments in human capital (for the individual household member and for the household). According to the Harris-Todaro (HT) model, potential migrants compare the expected returns in different possible destinations (including the probability of unemployment) to the expected returns in the “home” community. The HT model, consistent with most empirical observation from SSA, predicts that younger and

²⁸ Households hold human assets (i.e., labor) as precautionary savings (e.g., underemployed labor) and seasonal migration, and in this context seasonal migration can be viewed as risk mitigation. In cases of crop failures, and a lower demand for labor, seasonal migration can be viewed as risk coping.

better-educated people, with higher expected returns to their human capital are most likely to migrate. When risk is brought into the equation, the picture changes only slightly. If households seek to minimize risk, then migration would be expected to occur from low return, high variability areas, to higher return-lower variability areas. Ingene (1991) and Banerjee and Newman (1998) suggest that investment in risk management in rural areas (e.g., investment in physical and social infrastructure, agricultural research and extension) could slow rural to urban migration. Risk in rural areas can stimulate migration; different forms of insurance can affect this relationship (either to promote or discourage migration, as discussed below). Thus, although this paper focuses on risk management by poor rural households, it is critical to emphasize the links between rural and urban poverty and vulnerability.²⁹

When migration of a single household member occurs, the decision can be conceived clearly as a spatial (or sectoral) diversification strategy. The household's human capital is reduced by migration (if we consider human capital as *in-situ* household labor) and exchanged for social capital. Expected returns to the "home" household from migration are in the form of remittances. Considerable literature exists on migration and remittances, about its importance in total household income, whether it is adjusted to reflect fluctuations in household income, whether it is used for consumption smoothing or investment, and whether it is equity increasing or decreasing, etc. (e.g., Poirne, 1997).

Empirical evidence reflects a wide range of outcomes, so it is hard to generalize. However, in general, remittance receipts tend to be uncorrelated or slightly negatively correlated with household income, so that there is only some minor stabilizing impact on household income. Remittances usually come in the form of cash or liquid assets and help households in their consumption smoothing activities, and poorer households tend to benefit, proportionally (based on the percent of income), more. Migration can result in remittance flows to and from the household. Few studies have examined the dynamics of remittance flows or associated transactions costs, and evidence about remittances is usually taken from a single time period.³⁰ If migration is a household response to risk, then examining static remittances or average remittance flows is not an appropriate analysis since it is necessary to examine how the flows respond to realizations of outcomes. That is, how do flows from the sending to receiving households change in response to risky events and outcomes?

Marriage and extending social ties through marriage are another means of spatial diversification of the household's human assets. While there is little known evidence from SSA, Rozensweig (1988) finds a statistically significant negative covariation between rainfall in a man's home community and his wife's community in India. This evidence supports the hypothesis that marriage is a means of insuring against (community-specific) covariate risk.

The verdict on migration is not clear. One argument holds that migration is a market-based response to disequilibria in human capital markets and transactions costs associated with migration should be reduced through public policies. Such policies include services to improve

²⁹ According to Mundlak *et al.* (1997, p.15): "... off-farm migration is probably the most important single process that contributes to the alleviation of rural poverty. This result should be kept in mind in judging not only economic processes but also institutional and legal reforms."

³⁰ Transactions costs associated with remittances have received little or no attention among policymakers. These transactions costs are likely to be very high, especially when long bus trips are necessary, and efforts to bring them down will lead to efficiency gains. Even in the US, studies indicate that migrant Mexican farm workers pay as much as 20% of remittances to transfer money back home to Mexico (Trupo and Alwang, 1998).

spatial labor market clearing (e.g., information), subsidized urban housing, etc. Rural-urban migration can be harmful when it occurs at an overly rapid pace and in-migrants outstrip local capacity to provide public services. This view of migration argues for public planning and foresight to remove some of the more damaging effects of over-rapid migration.

Social risk management strategies should support planning efforts that encourage permanent migration from high-risk areas to lower risk, higher return areas. The existence and effectiveness of insurance and finance markets affect the benefits and costs associated with migration. Policies aimed at lowering the transactions costs associated with sending remittances will increase the benefits associated with migration. Improved formal insurance and finance markets in rural areas, on the other hand, might make migration a less attractive option. Clearly, social and political objectives in a given country need to be taken into account to decide on the appropriate policies to encourage or discourage migration.

3.6.6 Inter-linked Contracts as a Form of Asset Diversification

Sharecropping and tenancy arrangements have been considered a type of risk management strategy. There is a contractual arrangement, whereby sharecroppers or tenants share the risk with landlords. The shareholders or tenants provide human assets in the form of labor, and sometimes natural assets in the form of land, and landlords provide financial assets in the form of inputs and sometimes human capital in the form of management (Stiglitz, 1988). Thus asset-poor households can combine their assets with wealthier households.

The efficiency and equity impacts of these interlinked land-labor-credit arrangements have been debated in the literature (Bell, 1988; Otsuka, *et. al.*, 1992). The major advantage of this type of insurance and finance arrangement is that it counters the moral hazard problem and other informational asymmetries that lead to labor incentive problems.

Modern adaptations of some of the basic principles of inter-linked contracts, include contract farming, outsourcing, and vertical integration can provide some insurance and finance functions. Interest in contract farming, for example, where large scale farmers contract out with smallholders, providing various inputs (e.g., seeds and fertilizer) and support services (extension and markets) in exchange for guaranteed purchase of smallholders' output is based on the asymmetries of access to information, and various input and output markets (Ruddy, *et. al.*, 1999). Thus, poorer less empowered smallholders with limited assets can combine their assets with the assets of wealthier households, to the potential benefit of both sides. These alternative forms of inter-linked contracts are not without their own problems, especially in SSA countries with poorly functioning institutions to enforce contracts (Ruddy, *et. al.* 1999).

3.7 Insurance and Finance Markets

The responses to risk noted in the previous sections, such as diversification of income-generating activities, investments in assets as precautionary savings, migration, etc. are informal means of managing risk. These strategies have actual and opportunity costs, and are usually adopted due to the lack of formal insurance and finance markets.

In this section, we discuss insurance and finance instruments together. Due to imperfect or missing markets in rural areas there is a large degree of overlap between the two kinds of instruments (Gersovitz, 1988; Deaton, 1991; Besley, 1995, Zeller, *et. al.*, 1997). Furthermore, the major sources of market imperfections or failures are the same: (i) information asymmetries, (ii) covariate risk, and (iii) high transaction costs. The existence of informal markets reflects

problems associated with information asymmetries and high transactions costs. Informal mechanisms tend to fail in times of covariate risk, repeated shocks, and shocks of long duration.

Financial market intermediation is often preferred as a means of addressing risk as transactions costs tend to be lower when shifting among financial assets (see discussion of diversification). However, several serious problems are associated with financial markets in rural areas of LDCs. These problems are addressed below. The discussion of insurance that follows revolves around a discussion of the cost and viability of different insurance schemes. Insurance has important implications for efficiency because if income risk is fully insurable at an actuarially fair price, then decisionmakers can make production decisions without taking risk into account (Gersovitz, 1988; Deaton, 1997).

Missing, incomplete and inefficient rural insurance and finance (and other) markets might create a situation whereby self-insurance/finance (or informal arrangements) are optimal to address risk faced by poor households. However, in times of great stress (notably covariate risk), like crop failure due to drought, informal arrangements tend to break down. Efficient markets could radically change this situation, by substituting formal for informal arrangements.

3.7.1 Insurance

Formal insurance is limited or non-existent in most rural areas of SSA. Formal crop insurance, for example, does not exist, mostly because the strong tendency toward spatial covariance in risk, but also because of problems associated with moral hazard and high transaction costs. Transaction costs include the cost of obtaining information and the cost of contract enforcement. For these reasons, arrangements tend to be informal and revolve around single rural communities. However, recent innovations in formal insurance markets provide insights into how such schemes might be effective in SSA.

The viability of formal and informal insurance arrangements depends, to some extent, on the nature of the risk. An important consideration when evaluating the potential for insurance is the insurability of the risk (see box 3).

Most insurance instruments are community-based informal insurance arrangements. These arrangements usually reflect “social contracts” that result from investments in social capital. Informal arrangements use group pressure and community-specific information to overcome problems associated with moral hazard. Recently there has been more and more literature that questions the efficiency and equity impacts of social insurance, and its ability to cover covariate risk (Morduch, 1999). When risk payoffs are most needed, the informal insurance system tends to break down, because village-level arrangements are not effective against spatially correlated (covariate) shocks, since incomes of all the village’s households are negatively impacted by the risk-related event. In essence, the risk pool tends to be small in informal arrangements.

Box 3: Conditions for Insurability

Insurance is an important risk management strategy that can help cushion the impact of adverse events on poor and vulnerable households. Formal insurance is not widespread in rural areas, particularly in LDCs where the insurability of risk is uncertain mainly due to problems of moral hazard and adverse selection. These problems affect the insurability of risk. To be an actuarially insurable risk three conditions must be met (Hazell, 1992):

- 1) The probability of the event occurring must be quantifiable.
- 2) The damage caused by the event (i.e., the outcome) must be quantifiable and must be valued.
- 3) Neither the occurrence of the event nor the damage it causes should be affected by the insured party's behavior (absence of *moral hazard*).

For insurance to be economically viable, there should be no *adverse selection*, whereby parties with higher than average expected damages participate in the insurance arrangement with risk premiums based on the average damages, and parties with lower than average expected damages do not participate. Furthermore, to be economically viable, a private insurer must cover administrative costs of the insurance arrangement. Such conditions are rarely met.

In fact, actuarially based insurance is viable in only a small subset of the risks faced by the rural poor. These include some production risks (e.g., losses due to catastrophic weather events, pest infestations, hail and floods), health risks, and asset loss (e.g., theft, fire) risks. Many production risks (e.g., preventable and/or localized damage from pests, diseases, minor weather events, germination failure, fire) are not strictly insurable. Furthermore, there are cases of high frequency, high intensity, repeated covariate risks for which the poor could probably not afford the risk premiums without sizeable subsidies. Because of these failures in risk markets, there is a legitimate role for government intervention, either by providing or subsidizing insurance.

The risk pool for informal and community-based risk sharing arrangements can be expanded in a number of ways. First, migration and marriage can expand the risk pool by spatially extending family ties. Second, communities can engage in political processes and alliances that spread the extent of their social capital claim outside their boundaries. Third, steps that reduce the costs of obtaining information, such as enforcement of press and other media freedoms can “expand” the informal risk pool.

Informal community-based risk sharing arrangements usually reflect attempts to deal with household risk management objectives #1 and #2. They do not provide guarantees of a given level of consumption, but rather are used to manage damage (loss) when idiosyncratic catastrophe occurs. Thus, they tend not to reduce welfare losses due to uncertainty (because they do not smooth consumption), but only weakly ensure against life-threatening loss.

Informal insurance, even for idiosyncratic risk, is not available to all poor rural households. A great deal of social exclusion takes place, some based on economic factors (vulnerable households not wanted in risk pool), social (community kinship ties and networks might exclude newcomers and/or on the basis of gender, tribe, etc. And, when household-level or community-level risk-related pressures are greatest, the most vulnerable members of the household or village tend to be excluded (Sahn, 1989). In addition, informal insurance is usually associated with high costs (Murdoch, 1995; 1999).

Since informal insurance is not necessarily subjected to competitive forces and is based on social relationships, it can be relatively expensive and exclusive. Thus, the poorest and most vulnerable

households might be excluded, for various social, economic or political reasons. Furthermore, informal insurance arrangements tend to collapse with covariate risk, and there is a general trend toward the weakening of social networks and ties as economies start to modernize and exchanges become more commercial and impersonal (Morduch, 1999).

Lipton and Ravallion (1995, pp. 2621) summarize some of the weaknesses of these arrangements:

“Community-based risk sharing arrangements may be less prone to moral hazard and adverse selection, but they must still be implementable without binding, legally enforceable contracts. This fact constrains performance for the poor, particularly in spells of transient poverty, or when the threat of destitution reduces the probability of continued participation in social insurance. All of this may justify public actions to partly insure or subsidize poor people’s production and price risks, or to reduce or insure their “background” risks to health and food security.”

Formal actuarial insurance is not a panacea for risk problems faced by poor rural households. Such insurance does not address many sources of risk and subsequent shortfalls in income and consumption. There are situations where formal or informal insurance arrangements can perform with relative efficiency and equity. These situations need to be identified and market and social institutions strengthened to help facilitate this dimension of risk management. Mechanisms for strengthening institutions include provision of information, technical assistance, infrastructure, legal framework, etc. However, these situations are likely to be the exceptions rather than representative of the general situation in most rural areas. Murdoch (1995) points out that there have been a number of institutional and individual responses to filling holes (due to market failures) in insurance markets. He concludes that there is a consensus in the literature on risk and insurance about the existence of “holes” in insurance markets, but also claims that there are appropriate public actions that, if they consider the positive and negative attributes of formal and informal arrangements, can actually go a long way towards filling the holes.

This leaves some role for public or publicly supported insurance arrangements, to provide information on risks and losses, and to possibly subsidize formal actuarial or informal insurance arrangements. These interventions could be justified using public good, market failure, or equity criteria. For example, formal public-supported insurance schemes could involve comprehensive income insurance (safety net) programs that protect poor and vulnerable households. Governments and international organizations could work together with the private sector to provide multi-peril disaster insurance based on objective risk/loss criteria (see box 4). If such support is certain, this might affect the decision by individuals to self-insure and attitudes toward risk-taking. For society to minimize the expected costs of providing guaranteed multi-peril disaster insurance it can choose among three broad classes of policy: (i) regulation (the “stick”), (ii) taxes and subsidies (the “carrot”), (iii) information dissemination (the “roadmap”), or (d) some combination of the above (Lewis and Nickerson, 1989).

The public sector has a role in designing, funding and regulating self-insurance programs. Some self-targeting public works programs in India are examples of income insurance that deal with moral hazard and adverse selection by requiring manual labor at minimum wages, or even below minimum wage. Any decision to support formal insurance arrangements should recognize the impact that informal arrangements, self insurance, and community-based risk sharing arrangements have on the viability of formal insurance. Good examples of informal arrangements should be exploited in a context-specific manner, and efforts to broaden the risk pool of these arrangements might be considered as a first effort at publicly supported formal insurance. Desirable attributes of community-based systems such as local knowledge, group suasion, etc. should be incorporated into formal programs.

Box 4: New Insurance Programs

An example of an innovative formal actuarial insurance program is the World Bank financed Nicaragua Risk Management Project, a pilot program started in 1999 and based on the concepts presented in Guatam, *et. al.* (1994). Agricultural producers and other parties affected by rain-induced production risk (e.g., backward- and forward-linked enterprises, bankers and traders) would be able to purchase “rain lottery tickets”, with payoffs when rainfall in a given area was below a given trigger. This approach deals with moral hazard problems, adverse selection, and high administrative costs (no-one can influence the trigger point and all of the public can participate, and lottery tickets are sold in small denominations by vendors, and these sales generate employment).

A new multi-peril disaster insurance approach has been proposed for the US (Skees, *et. al.*, 1997; Miranda and Glauber, 1997) and other countries, including SSA (Sakuri and Reardon, 1997). This “area yield insurance” can provide effective risk management in areas where yield risks are highly covariate. That is, an area with similar soils, climate, and farming systems needs to be identified, trying to identify the largest possible number of participating farms. This “homogeneity” allows for calculation of the trigger and compensation payments. Farmers receive compensation payments when average yields in the area fall below some pre-determined trigger. However, it must be noted, that farm-specific soil and climatic conditions, and farm-specific enterprise mixes can result in a situation where household (idiosyncratic) risk is not covered by this insurance, and supplemental farm-specific insurance might be needed to help protect rural households (Skees, *et. al.*, 1997). Or, the insurance premiums can be set in a way that farmers can select a scaling factor, e.g., at 75%, 100%, or 125% of loss coverage.

Private demand for specific types of insurance depends on the degree of risk, decisionmaker objectives, the decisionmaker’s degree of risk aversion, and the cost of the insurance relative to alternatives. When mechanisms such as diversification exist to manage risk, the demand for alternative forms of insurance will fall. In cases where the decisionmaker is driven by objectives such as safety-first, he or she may only demand certain forms of insurance (such as disaster insurance). When low-cost alternatives exist, or when costs of alternatives can be shifted to others, demand decreases. Informal insurance and community-based risk sharing arrangements will also lower the demand for insurance. If risk aversion is a declining function of income and wealth, as most studies conclude, demands for some forms of insurance might decline as income and wealth increases. However, the demand for some form of insurance, by both wealthier and vulnerable households, will continue to exist.

Insurance can be a powerful tool for managing risk and promoting growth-oriented efficiency. If properly designed and priced, it can crowd out inefficient forms of self-insurance and crowd in desirable practices. If economic development is viewed as a process of Schumpeterian change, then insurance, as far as it promotes efficient risk taking, can be a vital part of the development process. On the other hand, if insurance promotes excessive risk taking (moral hazard) then its effect on economic development can be negative.

3.7.2 Finance

Financial instruments (such as savings and borrowing) represent an effective means of addressing risk, and are especially useful in smoothing consumption when income is variable. Financial instruments can involve fewer transaction costs than the use of precautionary savings in physical assets, and they can be used for a variety of purposes – including insurance and credit. The key issues surrounding their use as “insurance” include: (i) their availability, and, particularly, accessibility for the poor; (ii) the costs associated with their use; and (iii) equity implications.

Several studies exist that examine these issues. Below we highlight some of the findings of the comprehensive review by Zeller, *et. al.* (1997).

Finance was traditionally thought of as a means of increasing agricultural production by allowing resource-constrained farmers access to credit for inputs. More recently, finance has begun to be looked at as one of a number ways of addressing the multiple constraints faced by the poor. Access to good financial services can improve the ability of vulnerable households to bear risk as they enable investments and purchases of inputs that improve returns to existing assets. Also, finance can facilitate “diversification,” e.g. into perennial and tree crops. Finance has an obvious potential role in smoothing consumption in the face of income risk. Smoothly functioning financial systems can thus increase returns to existing assets (and shift the production possibilities frontier outward), lower the variability of returns, and assist households in mitigating existing variability.

As Zeller, *et. al.* (1997, p.2) summarize:

“Rural finance for enhancing household food security not only implies credit for agricultural production or off-farm micro-enterprises, but also credit and savings services that respond to the demand for precautionary savings and consumption smoothing, as well as the provision of savings options with different maturity dates, risks, and interest rates for more efficient asset portfolios and capital accumulation.”

Coverage of formal financial systems is far from comprehensive across rural SSA, and their spread is constrained by a number of factors. These include informational asymmetries (including adverse selection), enforcement problems, risks of default (either idiosyncratic or covariate), and lack of acceptable forms of collateral. These factors all lead to high unit transactions costs, more limited spread of institutions, and less access for the poor. Community-level institutions and some informal systems can circumvent many of these problems, and investigation of success stories can be fruitful (see box 5).

The lessons from experience with rural finance for risk management are similar to those in the formal insurance literature. Studies of rural financial markets stress the diversity of institutions, but conclude that formal support for rural finance should build on existing rural financial markets and avoid undermining them. Informal financial markets exploit traditional mechanisms for addressing market failures; some of these mechanisms can be readily incorporated into formal schemes. Since one of the best features of financial assets is their fungibility, formal systems should avoid rigidity and allow the asset to be used in its “best” possible way. Finance can help crowd out some of the more pernicious risk management strategies, but consumption credit has not traditionally been viewed by policymakers as an effective use of public resources. However, The most recent studies indicate that consumption credit can help manage risk in an efficient manner (Zeller, *et. al.*, 1997).

Box 5: New Finance Programs

Several innovative formal systems build on the principals of informal finance, particularly those that use local information and social structures for enforcing contracts. Member-based enforcement is also common. The most well-known of these examples is the Grameen Bank, which lends to groups of poor women and uses group pressure to enforce repayments. Zeller, *et.al.* (1997) identify a number of innovative rural finance programs in Africa and note that successful versions of these institutions have a strong demand-led orientation. They almost always include savings schemes, diverse credit services and flexible collateral requirements. That is, they provide services (such as consumption credit) that are highly demanded by their clients, under conditions that the rural poor can meet.

Inputs on Credit

A joint ICRISAT / PLAN (an NGO) groundnut seed multiplication scheme in Malawi shows promise in exploiting community-based measures to deal with common problems of typical rural finance programs. Smallholders who show interest in the program are provided a 5 kg packet of high-yielding groundnut seeds. After the first year, the participant repays the loan by providing 5 kg seed packs to two of her neighbors. The program multiplies seed in this manner. Because the loan is repaid to neighbors, group pressure and individual self interest help reinforce payments. The second-year recipients of the seed package monitor the efforts of the first-year recipient, reducing moral hazard and promoting group learning.

3.8 Summary

Assets transmit risk to the household and are used by households to manage risks. Some asset allocations in response to risk can improve efficiency, while others do not. Asset allocations have implications for household members that differ by gender and age. Finance theory helps us understand some of the tradeoffs between risk reduction and levels of expected outcomes, but is not always relevant to the analysis of behavior of the poor and vulnerable. Because of multiple household objectives, it is difficult to determine the degree to which different asset allocations represent responses to risk. Thus, the demand for risk reduction is difficult to measure, but it is clear that some inefficient risk management techniques will lower demands for formal and informal insurance. In some cases, social risk management may need to subsidize participation, particularly among the poorest. New and innovative formal insurance and finance markets and institutions, some based on positive attributes associated with informal arrangements, are being tested and show promise.

However, risk related behavior among the vulnerable may not change in response to the introduction of risk management mechanisms. Risk management will certainly crowd out many of the most “harmful” coping mechanisms, but other complementary efforts may be necessary to crowd out inefficient and otherwise detrimental ex-ante behavior.

Several messages are appropriate for design of effective risk reduction measures. First, efforts should be made to reduce transaction costs associated with good behavior. Examples include lowering the costs of sending remittances and increased information about labor force opportunities. Second, efforts should build on “good” informal measures and exploit local-specific knowledge to eliminate market failures and promote local enforcement. Third, several new schemes for insurance design were presented. Finally, the link between the asset base and the size of the risk pool provide ideas about how the risk pool might be expanded. Local

governments can forge political links with other levels of government and appropriate infrastructure and information can be provided.

4. COMMUNITY AND GOVERNMENT ROLES IN RISK MANAGEMENT

In this section we discuss risk management from the perspective of community and higher levels, emphasizing how investments and policies at these different levels can assist or hinder household risk management.

Public investments, policies, and institutions can help reduce the sources of risk, reduce the susceptibility of households to risk, and help mitigate the impacts of risky events. There are several ways that communities and different levels of government can act to affect risk. Only some of these are direct measures to deal with household risk (e.g., price stabilization policies, investments in agricultural research and extension aimed at yield stabilization, insurance schemes). Others are more indirect (e.g., investments in infrastructure, investments in education, policies that promote economic liberalization and market integration). Indirect measures are desirable because they can strengthen asset portfolios, foster structural transformation of the economy, and lead to increased growth and development – in addition to specifically assisting households manage risk.

Investments in social and physical infrastructure, policies that promote and protect economic, social and political stability, rules and regulations concerning human and property rights, market development and flows of information, social inclusion and political empowerment can increase economic integration. They also strengthen household asset portfolios by increasing expected returns, improving the usefulness of assets for risk management, provide a broader array of instruments for risk management, and expand the risk pool. For example, investments in transport infrastructure can strengthen economic integration and minimize problems associated with asset price endogeneity (by expanding the risk and market pools).

We begin this section by discussing how economic development and the accompanying structural transformation of the economy can help lower risk. Following this, we discuss ways that communities can build and enhance their asset base through different investments, institutional arrangements, and group actions. Finally, we turn to specific public actions and policies to reduce and manage risk.

4.1 Economic Development and Risk

Economic development is the process of structural transformation that takes place as society's assets and resources are shifted out of production agriculture and into industry and services. A broadening and deepening of sectoral and spatial linkages accompanies this transformation (Siegel *et. al.* 1993; Siegel, *et. al.*, 1995b). The change in economic structure is stimulated by technological change and innovations, increased savings and investment, changes in enterprise mixes, changes in demand, and opening of new markets. There are also social, political and institutional implications of this structural change of the economy. The process of economic development is dynamic and cumulative, and investments in human, social, locational, political and institutional assets can endogenize the process.

Broad-based economic development can alleviate some of the constraints facing poor and vulnerable rural households. It can reduce some forms of risk and provide improved instruments for households to manage risk, but can also introduce a new set of risks, including higher market exposure and a greater susceptibility to risk emanating from external factors. For example, economic diversification at the national level can be associated with greater specialization in production at the household level, according to comparative advantage. Development also

implies increased use of purchased inputs and food from, and sales of outputs to, distant markets. This can increase household's perception of market risk. Aversion to this risk (which can be justified if, for example, economic liberalization policies are not accompanied by policies and investments that promote market development and integration), can lead to the persistence of safety-first behavior, which constrains technology adoption, and in turn, the process of development.

The process of economic diversification might reduce some risks. Diversified economies tend to be less prone to cyclical downturns and also tend to be more resilient. The increase in sectoral and spatial diversity in the economy, resulting from the spatial spread of input and output markets can provide a wider pool to spread risks, and additional opportunities to increase and stabilize returns. Sectoral diversity is consistent with greater flexibility and mobility of assets, thereby improving the ability of households to manage and respond to risk.

4.1.1 Linkages, Multipliers and Risk

Farm and nonfarm linkages and their associated growth multipliers help power the process of economic growth (e.g., Hagbladde, *et. al.*, 1989). A close relationship usually exists between agricultural intensification and overall growth. Studies in a number of SSA countries show that an initial increase in rural incomes are multiplied by an order of about 2.0 due to conventional economic multipliers (e.g., Hagbladde, *et. al.*, 1989; Delgado, 1994). Strategies of agricultural intensification and support for non-agricultural sectors represent an attempt to deepen and broaden sectoral and spatial linkages, and thereby take advantage of these multipliers. This type of diversification is closely associated with the successful model of agricultural-led economic development in Asia (Barghouti, *et. al.*, 1990).

It is tempting to conclude that economic linkages and multipliers should actually increase risk. That is, if an increase in incomes is multiplied by 2.0, then it might be assumed that an economic downturn or shortfall will be similarly multiplied, and sectoral and spatial diversification might increase the magnitude and spread of the risk. In fact, the multipliers are not necessarily symmetric, and the multiplier of a decrease in regional income will tend to be smaller than the multiplier associated with an increase, at least in the short-term.

An examination of the nature of the multiplier reveals why. The two forces that create the multiplier are backward and forward linkages. Backward linkages are associated with input purchases (of both physical goods and related services), and for most covariate shocks these purchases will not decline as dramatically as the shock implies. One example has to do with the timing of the shock; drought usually manifests itself after application of fertilizer and other purchased inputs, so that a drought will often not reduce input purchases significantly. Similarly, forward linkages, which are associated with harvest and post-harvest activities such as processing, storage, marketing and transport activities, and local consumption expenditures, will tend not decline by as much as the initial shock. Consumption smoothing, insurance arrangements, dissavings, etc. ensure that the shock to consumption is usually not as great as the shock to income. Of course, some consumption smoothing behavior will crowd out market purchases of goods and services that take place in an "average" year, but the short-term decline in market activity will generally not be as great as the fall in income.

Other evidence shows, however, that mildly diversified economies may have higher susceptibility to droughts due to multiplier effects (see box 6).

Box 6: The Impact of Drought on SSA Economies: Multiplier Effects

A recent study on the relationship between drought and economic structure in SSA economies investigates the short- and long-term multiplier effects on the rural economy and the macroeconomy (Benson and Clay, 1998). The authors find that more diversified agricultural sectors and economies might suffer negative economic impacts from droughts that are more intense and of longer duration. Higher multipliers spread the impacts of crop failure to backward and forward linked sectors, and economic recovery is postponed by the negative impact on the financial sector. However, they also claim that there is evidence of an “inverted U” and as economies reach a certain level of economic diversification their vulnerability to drought and the multiplier effects are less pronounced.

The authors point out that the relationships are complex, that there are numerous factors relating to the economic structure, and the social, political, institutional, and infrastructural structure, and the natural asset base that also must be considered. Thus, a country-specific multi-sectoral approach is required to unravel the complex relationships and understand the implications for public policy, investments and other actions. The authors conclude that: “The impacts of drought mediated through intersectoral linkages are complex. Without more sophisticated modeling, these effects could be addressed only superficially in this study. However, the study has suggested a broad framework within which some of these issues can be explored in more detail at a country-specific level (Benson and Clay, 1998, p.64).”

Economic linkages have several implications for social risk management. First, social risk management efforts should work in conjunction with other rural development efforts to reduce transaction costs, promote market-based behavior, and broaden and deepen economic linkages. Second, efforts should be made to help households smooth consumption in the case of major shocks, and thereby weaken the strength of the down-side multipliers. Third, social risk management should carefully consider the role of ex-post risk management strategies that include measures aimed at helping households recover from the shock (e.g., cash, credit, in-kind payments or public works that households can use to protect, maintain and enhance their assets in order to generate income in the following period)³¹, thereby preventing a longer-term or more severe negative impact. In each of these cases, where appropriate, market-based mechanisms could be encouraged to strengthen linkages and multipliers. For instance, instead of public distribution of inputs or food after a shock, input (or food) coupons could be distributed, and the physical product distributed through the market system. Public works projects can be carried out through private contracting. This, of course, assumes that markets and institutions exist and function. In the absence of functioning markets and institutions, the opportunity should be exploited to help create markets and institutions, which will also have longer-term beneficial impacts. Social funds, for example, can be used to help fulfill this role and achieve short and longer-term objectives.

4.1.2 Growth-Stability Tradeoffs

Economic development theory is ambiguous about the existence of a growth-stability tradeoff at the regional or national level. Regional and national economic diversification can have growth enhancing and growth retarding impacts, and stability-enhancing or destabilizing impacts, depending on its direction (Siegel, *et. al.*, 1995b). The E-V framework (including the points of clarification) presented for a household’s asset portfolio is applicable, in principle, to the sectoral asset portfolio of a region or nation (see section 3.6.1). That is, there is no pre-destined growth-stability (E-V) tradeoff frontier, and the shape of the frontier will depend on various factors.

³¹ Cash for public works and distribution of seed/fertilizer packs are examples.

Finance-based theories do not provide exact guidance for diversification of regional or national assets, especially in planning an optimal asset portfolio with the objective of risk minimization subject to given growth targets (Siegel, *et. al.*, 1995b). An obvious constraint is the limited mobility of assets between sectors and through space. The distributional impacts of sectoral diversification should also be taken into account (Siegel, *et. al.*, 1995a).

The integration and extension of markets and the increasing diversity of income-generating activities can stabilize or destabilize regional income, depending on the covariances of returns from different sectors and activities. The region's social, infrastructure and location, and political and institutional assets will all influence regional and household comparative advantage and, in turn, expected sectoral returns and their variability, and expected returns for household assets and their variability.

Growth of market opportunities and diversification of an economy create new opportunities for, and lower the costs of, engaging in alternative income-generating activities. These activities can increase and stabilize household income. Market growth also lowers transactions costs associated with provision of insurance and financial services, marketing services, and some public services, and it increases the benefits from public investments (particularly physical and social infrastructure). Lower transactions costs and investments in infrastructure can lower some market-based risks and can transform covariate risk into idiosyncratic risk by expanding the risk and asset pools, and improving the availability and effectiveness of risk instruments. For example, if a community is isolated and transport costs are high, crop failure in a major food staple becomes a covariate risk affecting all households in a similar manner. If transport infrastructure and services exist, crop failure may lower households' incomes, but their consumption can be smoothed through dissavings (without problems associated with endogenous price risk), and well-functioning markets allow food staples to be brought in at reasonable costs.

Excessive risk can inhibit prospects for broad-based growth. Inefficient informal insurance, inefficient savings and poor financial intermediation are associated with high risk aversion among poor households. Scarce capital assets are funneled into non-productive uses, as households accumulate precautionary savings or invest in social capital to provide self insurance and finance. The problem of insufficient demand for new goods and services, which exists in many rural areas of SSA (and related, in part, to risk-averse behavior), can constrain the take-off of the economic diversification process. Many poor SSA communities have limited marketable surpluses, and semi-subsistence agriculture has relatively small multipliers. As part of this vicious cycle, commercial activity is limited, and the extent of sectoral and spatial diversification and growth-promoting multipliers are also limited. Thus, although communities can be buffered from external price and policy risks, they are more vulnerable to covariate risks, due to their economic and spatial isolation.³²

The availability of dependable and affordable sources of insurance and finance can increase the ability of the poor to bear risk and undertake "new" investments. There is potential for such investments to be destabilizing because of moral hazard. That is, households with insurance might become reckless. However, risk taking (and even some "reckless behavior") is necessary for technology adoption and innovation, and risk management mechanisms that encourage risk taking behavior can play a role in promoting broad-based economic growth. Some benefit-cost analyses are required to measure the welfare gains and losses from policies that include the potential for moral hazard. In some cases, the dynamic efficiency and equity benefits associated with increased expected returns might outweigh the losses associated with moral hazard.

³² Recall our definition of vulnerability in section 2.3 and the discussion in footnote 7.

4.1.3 Rural Micro and Small Enterprises

Much of the risk in rural areas of SSA is related to the variability that is characteristic of agricultural production. Most of the discussion in this paper centers on risks associated with agriculture. However, as pointed out in discussions of household strategies to manage risk, and the process of economic diversification, economic activities linked to agricultural production through backward and forward linkages, and non-agricultural activities also take place in the rural economy. In fact, employment and income from rural micro and small enterprises (MSEs) comprise an important component of total employment and income for many rural households, especially poor and vulnerable households with small landholdings (Reardon, 1997; Liedholm, 1998).³³ Females are particularly active in MSEs (e.g., marketing, beer brewing, food processing, clothing production and repair). The importance of MSEs in the rural economy has often been overlooked, but they potentially have a major role to play in the economic diversification of rural areas, and can provide a means for households to both increase household income and reduce income risk (Reardon, 1997; Liedholm, 1998).

In SSA, due to the seasonal demand for agricultural labor, MSEs can play a major role in providing additional (as opposed to alternative) income-generating possibilities. MSEs can help households increase expected returns to their human assets, which tend to be underutilized during parts of the year. In some MSEs the labor demands move in a counter-cyclical manner to the agricultural season, thus stabilizing intra-year income. An example is beer-brewing and post-harvest processing activities. Many MSEs are linked through backward or forward linkages to agricultural production and might have pro-cyclical income flows, which, in theory increase income instability. However, if MSEs also allow households to increase their expected returns, their vulnerability might actually decrease despite an increase in income variability.

4.2 Community-Level Assets

Location helps determine comparative advantage. Community natural assets and local climatic factors influence household assets' productivity and variability of production (based on input:output relationships). Location also affects the rate of return on assets and the variability of returns (based on prices of inputs and outputs). Communities have some influence over these natural and location-specific factors through investments in physical and social infrastructure.

Investments in infrastructure can reduce the probability of risky events and help households manage their assets to reduce and mitigate risk. These investments include a safe and dependable water supply system, sanitation and drainage, schools, health clinics, marketplace, assembly centers, transportation and communication infrastructure, protection and enhancement of the natural asset "commons", etc.

To make appropriate decisions on community-level infrastructure investments, and to maintain these community assets, there is a need for inclusive and participatory social and political organizations and institutions that provide forums for decisionmaking based on consensus and community needs. Inclusive and participatory, honest and competent local governance is also crucial. The lack of equal opportunity, based on discrimination associated with gender, age, race, longevity of residence, etc. can create, perpetuate, and accelerate inefficiencies and inequities.

³³ According to Liedholm (1998), MSEs include all rural enterprises not engaged in primary sector activities such as production agriculture, forestry, fishing, mining. Thus, MSEs include all economic activities that are linked through backward or forward linkages to the primary sectors.

Many rural development projects have emphasized the need for community infrastructure and institutions, such as Integrated Rural Development Projects (IRDPs). However, many IRDPs failed because they did not develop an appropriate institutional framework to create a feeling of ownership, so that households and the community as a whole would maintain or improve the infrastructure. Another cause of the failure of IRDPs was the lack of appropriate policies and infrastructure at the extra-community level.

In addition to the community-level investments and institutions mentioned above, others can help facilitate the process of economic diversification. Some of these can be considered quasi-public goods (or merit goods). For example, hammermills have been found to increase food availability and lower female labor requirements for the tedious and arduous task of hand-grinding/pounding. Hammermills can be privately purchased and operated or purchased and operated at the community level or by a cooperative of community residents. Energy generation, too, can be private and small-scale or provided on a larger scale.³⁴ Community-level storage facilities can take advantage of economies-of-scale and lower unit storage costs (storage losses are significant in many SSA countries). Community grain storage facilities can also function as a “food bank”, which can help households smooth consumption through direct consumption of the grains or by selling them as needed. Communities can also help establish various production and marketing cooperatives, cooperative credit and savings groups, etc. Rental markets for lumpy productive assets, such as work animals, power generators, and farm equipment are also possible means of lowering the risk exposure of any single household. Communities should also explore the possibility of multi-community joint ventures in the activities mentioned above to expand their risk and assets pools.

The investments and institutions mentioned above might sound like throwbacks from the past, with a long history of failure. But, as mentioned previously, we must ask ourselves whether past failures were the result of poorly designed programs and a policy environment that doomed such programs to failure, or if cooperative efforts are doomed by their very nature, to fail. Considering the current interest in social capital and community-based development, an objective (i.e., non-ideological) re-assessment of these community and multi-community investments and institutions needs to be undertaken. Social funds, which deal with community-level investments and institutions might be useful in this context.

4.2.1 Community Management of Natural Assets

Socio-economic relationships in many rural areas are still subject to traditional rules and regulations. An important feature of natural asset management in much of rural SSA is the traditional system of land management. In most cases, community leaders administer these systems. Access to land, use and transfer rights (through lease, sale, and inheritance) are determined by traditional rules. Thus the traditional land system can have an impact on a household’s endowment of land and the expected returns and variability of returns to its land.³⁵

³⁴ Most rural households in SSA use fuelwood for cooking, lighting, and heating. This dependence on fuelwood has clear negative environmental impacts. Fuelwood is not good for powering irrigation systems or machinery used in MSEs. The lack of alternative energy systems is a constraint on economic growth and stability in rural communities. More attention needs to be devoted to low-technology, low-cost environmentally-friendly energy sources, such as solar collectors. In addition, more resources need to be devoted to improved fuelwood efficiency (in production such as agro-forestry and consumption such as improved stoves), and protection against deforestation and associated environmental damage.

³⁵ In SSA countries, where landlessness in rural areas is uncommon, small landholding size is a “good” indicator of poverty and vulnerability (Lipton and Ravallion, 1995).

Much has been written about traditional SSA land systems and their impacts on risk perceptions, agricultural productivity and technology adoption, use for collateral (e.g., Migot-Adholla *et. al.*, 1991; Bruce and Migot-Adholla, 1993). It is hard to generalize, but in some cases traditional land systems lead to sub-optimal resource allocations (through field fragmentation, disincentives to invest in land protection, maintenance and enhancement), restrictions on its use and transfer, and restrictions on its use as collateral. They can also be discriminatory against certain strata of the community, notably female-headed households and in-migrants that arrive in an area for reasons other than marriage.

It is, however, not easy to design an efficient, equitable, cost effective alternative, and socially-politically acceptable alternative to these traditional land systems. Land titling, for example is expensive and has questionable impacts on efficiency and equity (Place and Migot-Adholla, 1999). In other areas of the world with levels of inequality similar to those in SSA (e.g. Latin America), private property rights and land markets have not led to more equitable distributions of land, nor encouraged broad-based agricultural growth (de Janvry, *et. al.*, 1997).

Traditional land systems also have an impact on households' access to, and use of, common natural assets for grazing, fuelwood collection, water harvesting and irrigation, hunting and gathering, etc., and the protection, maintenance and enhancement of the commons. Traditional land systems usually provide managed access to common land. Common property management systems can provide a source of informal insurance by allowing various coping activities. Certain coping behaviors can draw down on community assets. These include overgrazing, cutting and selling fuelwood, and using the commons as a source of "wild foods." Community management of common land, including efforts to protect, maintain, and enhance it, can provide welfare-enhancing benefits in "average" years (e.g., soil conservation, agro-forestry) and an informal "insurance policy" against risks.

Traditional natural asset ownership, use, and transfer (including inheritance practices) need to be codified to promote secure property rights, and to prevent unwanted degradation of these assets. Traditional systems for natural asset management are not well understood, especially in the context of a modern economy. More attention needs to be devoted to designing appropriate community-level management systems that can lead to efficient, equitable, and sustainable natural asset management. Rules and regulation concerning natural assets, including property rights issues are critical to risk management by rural household, and have implications on social welfare.

4.2.2 Rules, Regulations and Security

Transparent and equitable rules and regulations, at the community and extra-community levels, especially concerning human and property rights can help reduce the susceptibility of vulnerable households to risk. In addition, risk is reduced when personal and material security is enhanced.

Political decentralization has set the stage for an expanded community-level and local government role in designing, implementing and enforcing rules and regulations, and providing security for personal and material assets. Traditional political, social and economic relationships and institutions are, in many cases, being challenged or simply breaking down due to political decentralization, economic liberalization and increasing commercialization. It is critical that traditional relationships and institutions be supported and/or modified, where appropriate, or replaced. The lack of stable political, social, and economic relationships and institutions will

increase the sources of risk and the susceptibility of households to risk, and hinder household management of risk.

The textbook conditions of a competitive economic system, including complete information, free entry and exit, mobility of assets, many buyers and sellers, standard weights and measures, truth in packaging, etc. are basic to most developed economies and are often taken for granted. However, in many LDCs, and particularly in rural areas of SSA, these conditions are often the exception rather than the rule. The lack of such conditions increases risk, both actual and perceived, and limits the effectiveness of household risk management. Vulnerable households are at a distinct disadvantage when these conditions exist. Wealthier households often have the means to circumvent these conditions and/or are the parties reaping some benefit from their absence (and thereby reluctant to have a “level playing field”).

4.3 Direct Government Actions to Help Households Manage Risk

Governments have tended to adopt several direct actions to help rural households manage risk (recall tables 3.1 and 3.2). Some of the actions address risk in an ex-ante fashion, and reduce the levels of risk being faced (e.g., immunization programs, agricultural research into drought resistant varieties). Others are also ex-ante, but focus on risk mitigation (e.g., crop insurance, commodity price stabilization). Whereas others are ex-post actions that help households cope with risk (e.g., safety-nets such as food aid and public works).

In previous sections we have discussed some of the policies and actions that can help households manage risk. Indirect actions are typical poverty alleviation programs that stress investments in human capital, infrastructure, promoting market development and broad-based labor intensive growth as a means of reducing poverty. Both direct and indirect measures can lower the vulnerability of households and make them better able to manage risk. Direct measures have been, or can be, substitutes for indirect measures. In many cases direct measures have been associated with the lack of indirect measures (i.e., the lack of investments and appropriate policies).³⁶ Direct measures can also compliment indirect measures to help households manage risk. The appropriate balance between direct and indirect measures is country-specific, based on the nature of risk and household characteristics, and is also dependent on national budgetary constraints and institutional capacity.

4.3.1 Programs Aimed at Reducing Health Risks

Improvements in health services, including immunization programs, can reduce the incidence and intensity of health-related risks. Other programs reduce health-related risks by improving household nutritional status (e.g., investments in water and sanitation services, supplementary feeding programs, food fortification). Programs aimed at eradicating malaria and preventing dehydration caused by diarrhea are also widespread. More attention is being devoted to programs that provide information on health risks and risk behavior, such as AIDS prevention and family planning. It must be noted that much of the funding for, and the provision of, these services are through NGOs, charitable organizations, and donors, and not through budget-constrained governments. However, national and local governments have a critical role in petitioning for such programs and providing whatever support is required, especially political support. Clearly, such

³⁶ The prevalence of policies biased against agricultural producers in much of SSA, especially smallholders, is well documented (e.g., Binswanger and Deininger, 1997). Some of these direct risk interventions were adopted to reduce the impacts of risk on agricultural producers, but usually they were adopted to buffer urban consumers from the food price instability that often results from yield instability.

programs and services should be an integral component of social risk management.

4.3.2 Agricultural Research and Extension

Yield stabilization measures aimed at reducing yield risk include public investments in irrigation, and soil conservation, and investments in research and extension aimed at drought, pest, and disease resistant crops, livestock and farming systems. In many SSA countries, public investments in irrigation and soil conservation are limited, and research and extension are poorly funded, and appropriate information is not generated or disseminated. In some SSA countries, ministries associated with agricultural production and environmental protection are undergoing restructuring, with budgets and priorities being re-evaluated.

However, vulnerable households have limited effectiveness in making their research demands known through collective action, and their perceptions of risk and management objectives (see sections 3.2 and 3.3), and management strategies (see section 3.6) might mislead and misguide researchers and extension agents about the kinds of research and extension they demand, due households limited asset base and missing or poorly functioning markets (Alwang and Siegel, 1999). Also, research and extension tend not to be geared toward the needs of vulnerable households nor do they tend to be sensitive to gender differences in the demand for technologies.

Investments in agricultural services (e.g., research and extension) and infrastructure should be evaluated according to their economic viability, including the value of risk reduction and impacts on expected returns for vulnerable households.³⁷ Public investments in irrigation infrastructure are usually made with the aim of increasing farmers' incomes (through the adoption of higher-value crops, or allowing for multiple-cropping). Investments in irrigation increase expected yields *and* lower yield risk. In contrast, whereas drought resistant crop varieties might lower yield risk, they might also lead to lower expected yields. Importantly, researchers and extension agents need to understand that poor and vulnerable households want increased expected income and stability, and not stable yields, per se.

Research on drought-resistant and short-season crops can reduce yield risk by stabilizing yields. In contrast, higher-yielding varieties and higher value crops can improve farmers' ability to manage risk (by increasing their incomes), and in some cases lead to greater yield stability. The tradeoff between risk reduction and expected yields and returns is particularly important when evaluating returns to research³⁸. If risk reduction (through research on drought-resistant crops) is associated with high opportunity costs (compared to high-yielding, non drought-resistant crops), then it might be preferable to support research on the latter, and deal with risk management by other mechanisms or instruments.

4.3.3 Crop Insurance

It has often been assumed that crop insurance is the panacea for yield risk, in that farmers could adopt higher-yielding and/or higher value crops and farming systems (including specialization) that would allow them to achieve higher expected returns. Crop insurance, in the case of yield losses, would provide farmers with compensation. However, there is a long history of attempts to

³⁷ There are ongoing debates on priority setting in agricultural research and extension and how benefits are distributed. Historically, many of the benefits of agricultural research and extension have accrued to better endowed farmers and urban consumers, bypassing poor rural producers (Binswanger and von Braun, 1993).

³⁸ Mutungadura (1997), for example, shows that research into drought-resistant varieties in Zimbabwe comes at the expense of reduced research on higher yield and return crops.

provide crop insurance to farmers in LDCs, and an equally long history of program failures, in terms of the costs incurred by governments and the benefits received by farmers (Hazell, *et. al*, 1986; Hazell, 1992). Despite the history of failures of crop insurance programs, there are new attempts to redesign programs that rectify some of the problematic aspects of past programs. In addition, as we have noted, even well designed programs are doomed to failure if other components of the economic, social and political system act as constraints on farmer's asset management decisions and other risks besides yield risk persist. Thus we emphasize the need for a multi-faceted approach to risk management

Crop insurance is a limited means of stabilizing income and consumption for vulnerable households because the major source of income for many vulnerable households is not from crop production, and many are net purchasers of food. Second (and related to the first point), there tends to be a high positive correlation between a household's landholding size and benefits received via crop insurance payoffs. Third, in times of covariate risk, households involved in economic activities that are linked to crop production will also be negatively impacted via the multiplier effects and via higher food prices.

One of the new insurance programs currently being tested in a pilot project takes these factors into account by providing insurance against events that cause crop failure through "lottery tickets" that can be purchased by all individuals and households. In addition to its focus on preventing moral hazard related inefficiencies, this type of universal disaster insurance is a promising effort at providing a more equitable type of insurance to vulnerable households (since it not directly linked to crop production and land holding). Of course, the poorest of households might not be able to afford the lottery tickets, but a complimentary subsidy of lottery tickets for such households could be instituted to deal with this problem.

4.3.4 Commodity Price Stabilization

In addition to problems associated with fluctuating yields, fluctuating prices also haunt vulnerable households, as producers and consumers. Commodity price stabilization has, in many cases, served as a substitute for formal crop insurance (Islam and Thomas, 1996; Deaton, 1997). Commodity price stabilization includes a variety of measures, including the setting of floor and ceiling prices, establishing and maintaining buffer stocks, acting as buyer of last resort, supporting crop diversification, and regulating export, import and domestic commodity markets. Experience with these programs in SSA indicates that they can, at times, be effective in stabilizing prices, but that stability usually comes at a high cost.

Grain storage programs, for example, imply high storage costs (including storage losses). Price-fixing measures tend to be financially unsustainable and can lead to inefficiencies. Pan-territorial price-fixing, once common in SSA countries, can lead to cropping patterns that are not based on comparative advantages. Price-fixing often requires significant subsidies in the short term, and can lead to more instability in the long term, if productivity in unsuitable areas declines or when supports are terminated. It has also been common in SSA countries for governments to serve as the buyer of last resort, which combines elements of price stabilization and price fixing (e.g., grains purchased to support floor prices are then used as buffer stocks). In addition, it has sometimes been suggested that governments encourage farmers to diversify their production to stabilize domestic commodity prices and/or export earnings. The above programs, and attempts to regulate commodity markets have hampered the development of competitive and efficient market mechanisms and provided misleading price signals to farmers, leading to inefficient and non-sustainable farming systems.

Despite the problems associated with commodity price stabilization programs, price stabilization can have a major impact on the welfare of vulnerable households. Many vulnerable rural households are net purchasers of food, and prices of staple foods comprise a major share of all vulnerable households' expenditures. Therefore, more efficient and equitable and less costly commodity price stabilization programs can be considered. The alternatives we mention here draw upon two of the major themes in this paper: (i) the extent of risk and asset pool, and (ii) the use of formal financial and insurance instruments. International food stocks and commodity price stabilization policies might be less expensive means of stabilizing domestic prices compared to food storage or guaranteeing floor and ceiling prices in times of abundant harvest. Instead of holding food stocks, supporting prices, regulating commodity markets, or attempting to diversify domestic commodity production it might be more efficient to invest in financial stocks, to invest in commodity futures markets, to purchase commodity price insurance in international markets, or participate in an international compensatory finance scheme such as STABEX. For these alternative schemes to be effective, there is a need for integrated food markets that allow price signals and food supplies to be transmitted to communities and households.³⁹

4.3.5 Information to Reduce and Mitigate Yield and Price Risk

Providing information to producers and consumers such as weather forecasts, crop forecasts, price forecasts, and markets can help lower risk and help households manage risk. Early warning systems, for example, can be an effective means of reducing and mitigating risks associated with drought-related events. And, if risk reduction and mitigation are insufficient or ineffective, food and nutrition monitoring can help identify households and communities that require assistance in coping, so as to avert famines.

Information such as crop and price forecasts can reduce risk and gradually build confidence in markets, and help move people away from safety-first decision rules. Safety-first behavior often results from fear that markets will not provide staple foods at affordable prices during critical periods. Information, in and of itself, has only limited impacts. Households need the means with which to respond to such information. Thus, once again, we emphasize the need for a multi-dimensional approach to risk management.

4.4 Summary

It is not possible to consider household risk management strategies without considering community and extra-community assets and risk instruments, and the overall economic, social, political and institutional structure of the rural economy and macroeconomy. Economic diversification is part and parcel of economic development and drives increases in the income, consumption and savings possibilities of households. Interactions between households, the community and higher levels of government can expand the asset and risk pool through a complex web of sectoral and spatial linkages that can lead to different outcomes in terms of growth and stability, efficiency and social welfare. Numerous policies, investments, and actions can promote both growth and stability, but they must be coordinated and balanced. It is possible that economic and political liberalization, increased market integration, and the spread of sectoral

³⁹ Market infrastructure can help lower price variability by allowing transactions to be made at lower costs. Even though some instability is attributable to more open markets, infrastructure can lower the severity of a covariate event by moderating basic price increases in the affected areas. In such a situation, infrastructure extends the risk pool by promoting market arbitrage.

and spatial linkages can increase household vulnerability. The appropriate mix of risk reduction, mitigation and coping mechanisms is crucial. More emphasis needs to be placed on policies, investments and actions that simultaneously promote broad-based growth and improve the availability and effectiveness of ex-ante household risk management strategies. Traditional social protection efforts to assist households cope with short-term risk (e.g., safety nets) should be strengthened and geared towards longer-term recovery.

Broad-based growth and development is the best way to lower poverty and vulnerability. Focusing on either increased economic growth or stability, as if they are mutually exclusive or to accept the growth-stability tradeoff paradigm from finance theory will only hinder efforts to help households manage risk. Just as “growth with equity” was a slogan for the development community in the 1970s and 1980s, the objective of “growth with stability and equity” is more appropriate for the end of the 1990s.

As we have pointed out throughout the paper, a necessary condition for this to take place is the universal guarantee of human and property rights and security, and the universal guarantee of disaster relief based on objective criteria. This will expand asset and risk pools, and provide vulnerable households with the minimal conditions to allow them to maximize returns to their portfolio of assets. Of course, more attention needs to be devoted to increasing the asset base vulnerable households (through policies, public investments and asset redistribution). As the asset-based approach (and simple logic) demonstrates, vulnerable households are caught in a vicious cycle and require a “push” to escape the poverty trap.

5. SOCIAL RISK MANAGEMENT: FROM CONCEPTS TO ACTIONS

Risk is pervasive in rural SSA. Risk increases the vulnerability of the poor and near poor. The objective of social risk management is to enable vulnerable households to better manage risk. In this paper we present a conceptual framework to help understand the complex decision-making process at work in risk management at the household, community and extra-community levels.

5.1 Review of Key Themes of Paper

Adaptations to risk by vulnerable households, using various risk reducing, mitigating and coping strategies, may lower short-term vulnerability, but increase households' vulnerability over the longer term. In addition, inefficient risk management strategies can lead to lower expected incomes, and might only be effective for certain types of idiosyncratic risks. When households adopt inefficient risk management strategies, assets are often depleted (sometimes with negative externalities), and asset accumulation is biased towards precautionary savings. It is difficult to quantify the degree of inefficiency associated with current household risk management strategies, but the breadth of examples presented in this paper suggests that these inefficiencies are substantial. The inability of vulnerable households to accumulate assets that increase their income-generating potential perpetuates the vicious cycle of poverty and limits economic development.

The vicious cycle of vulnerability can be portrayed as:

Limited asset base => management of risk leads to inefficient allocation of assets => low returns
=> low consumption => low savings and investment (and dissavings) => limited (declining) asset
base => lower returns, consumption, savings

The asset-based approach uses a broad definition of assets, a corresponding broad definition of the determinants of household welfare, and provides an inter-temporal framework to compare how households' wealth evolves over time. The key issue is how, with a given level of wealth, households perceive risk, set their management objectives, and allocate their assets in response to risk in the short term, and how these short-term decisions affect households' welfare and social welfare in the longer term.

Households reallocate their assets in response to risk and it is important to consider both the expected returns (E) and variability of returns (V) to their asset portfolio. Households with low E and V are vulnerable because even small risks can cause relatively large negative impacts on their welfare. Households with higher E, but also exposed to risks must protect themselves from falling into poverty. Both types of households allocate their assets to provide self-insurance and finance in an inefficient manner, sometimes with negative externalities. These asset reallocations lead to lower short-term returns and have an impact on longer-term vulnerability by limiting savings and investments in income-generating assets.

Risk attitudes are, to a large extent, influenced by asset portfolios and external factors such as existence of markets, access to infrastructure, policies and institutions; these also determine the availability of risk management instruments. This paper emphasizes the links between households, the community, and extra-community levels in terms of assets, risk instruments (asset and risk pools), and economic structure (inter-sectoral and spatial linkages).

Wealthier households tend to be less risk averse, have better access to risk management instruments, and are better situated to handle risk-related losses. Thus, risk can lead to greater disparity in the distribution of wealth and income over time.

5.2 Implications of Asset-Based Approach for Social Risk Management and Policy

The asset-based approach provides a framework for considering different dimensions of risk and its management. The broad definition of assets employed in this paper is consistent with a multi-sectoral approach to addressing risk management. Assets, their value and income-generating potential depend on economic, social, and political systems. Efforts to address risk must consider this dependence. The focus on risk and adaptations to it pushes the policy debate away from poverty alleviation as primarily an equity issue toward vulnerability reduction as an efficiency issue, with a goal to increase overall social welfare.

The focus on vulnerability is not, however, only concerned with risk. Our definition of vulnerability includes both susceptibility to shocks and downturns, and the expected level of the outcome. The very poor are vulnerable. The near poor, households with expected returns to assets above the poverty line, also risk falling below the poverty line following adverse outcomes. The vulnerability approach extends the policy focus beyond households who are below a given poverty line to those facing risks of falling below it.

The asset-based approach explicitly notes the linkages between assets at the household, community and extra-community levels. The sectoral and spatial spread of asset and risk pools determine the availability of risk instruments and the effectiveness of household risk management strategies, especially in dealing with covariate risk.

By examining attributes of assets and their use in managing risk, several points were highlighted:

1. The quantity of assets and their rate of return, together with attributes such as liquidity, and the substitutability/complimentarity of assets, help determine their usefulness for risk management. Assets are held for a variety of reasons including insurance, social value, etc. One of most important policy measures to enhance the value of assets in risk management is to establish clear and secure human and property rights, and transparent rules for the purchase and sale, holding and use of assets.
2. A stable macroeconomic environment should create confidence in markets, provide the means for better planning, and promote greater stability throughout the economy. A stable macroeconomic regime is necessary for effective and sustainable risk management.
3. Policy should focus on lowering the transaction costs associated with acquiring information and on expanding extension and educational programs that improve the dissemination and processing of such information by households. Weather and crop forecasts, market outlook, spatial price information, information about employment opportunities, and information on health, nutrition and family planning can all help households identify and select more effective allocation of assets. This assumes, of course, that appropriate institutions (including markets and a legal system that protects human, property and material rights) and infrastructure (social and physical) are in place.

These three items should lower exposure to risk and enhance the ability of households to manage risk. Households can expand their own risk pool by diversifying their portfolio and activities. Acquisition and trade of assets should be based on non-discriminatory rules and regulations, and should be combined with security of physical and material well-being. Information can smooth shocks (and spread risk) by promoting arbitrage over time and space. All of these actions are

well within the purview of government, but pursuit of them will require a cross-sectoral and multi-faceted approach involving different ministries, government and non-governmental institutions and organizations.

Market services could be improved by strengthening organizations and institutions, and by investing in physical and social infrastructure and human assets. Social funds, for example, could also be helpful in these efforts at the community and local government level.

4. Efforts should focus on building institutions for risk management, including community-based systems, and improving infrastructure at the community and extra-community levels. Formal insurance and finance systems should build on existing informal systems and minimize the crowding out of efficient informal systems. Public measures could help expand and strengthen the sectoral and spatial risk pool through information, infrastructure, political inclusion, and improved community capacity.
5. Effective measures should use community-based knowledge and enforcement and innovative designs of programs to address some of the problems of market failure. Potential insurance programs should carefully consider the insurability of the risks and the sources of market failures.
6. Efforts to crowd out “bad” coping measures require serious consideration. In rural areas of marginal agro-economic potential (e.g., drought-prone areas), coping or perpetual dependence on handouts are risk management strategies that lead to a similar outcome-- a guaranteed minimal level of existence. Policymakers need to consider the viability of support to such areas with a view toward phasing out assistance, and carry out benefit-cost analyses of alternative strategies (e.g., irrigation, promotion of non-agricultural activities, resettlement). In addition, policies to encourage migration should be considered where appropriate.

Social risk management should enable and empower households to better manage risk. Examples of increased risk-taking following the provision of minimum insurance guarantees should not be taken as evidence of moral hazard or program failure. In many cases, increased risk taking is necessary for development. Policy should thus be judged not on its financial viability, but on its impact on risk bearing, and on reductions in harmful coping activities that have negative impacts on household welfare.

Many of the suggested policies and investments, and institutional strengthening discussed in this paper in the context of social risk management are also interventions that should lead to broad-based growth. The identification and promotion of win-win policies, investments and institutional changes that lead to increased economic growth and stability should be a priority.

7. Efforts should be focused improving pro-active ex-ante risk management, risk reduction and mitigation, and to minimize the dependence on re-active ex-post coping strategies.
8. Efforts should be focused on the women-education-nutrition-children nexus. This includes rights for women and children, and efforts to increase their human asset base. Women and children often bear the brunt of shocks on vulnerable households. These shocks need to be reduced, but vulnerable households need the means to deal with risk.
9. Need for guaranteed minimum multi-peril insurance to help vulnerable households take risks with the hope for longer-term gains. Clear and transparent rules and funding mechanisms for multi-peril insurance schemes need to be considered.
10. Formal finance and insurance systems and institutions are critical to household risk management. The lack of such systems and institutions constrain the choice set of vulnerable households, who will need to take risks to improve their welfare over time.

11. Safety nets have an important role to play in risk management. Vulnerable households often require assistance. Social risk management should not replace the traditional social protection approach, but compliment it. Safety nets should help vulnerable households in their short-term coping and include payments (cash or in-kind) that help them get back on track, in terms of expanding their asset base. For example, public works programs could include immediate cash payments for work and also provide an additional savings component that could be redeemed at a latter date (possibly in return for specific investments in risk reducing or mitigating instruments). Social funds could also include a “bonus payment”, redeemable in the future, based on the success of the community’s completion of the project. These type of “forced savings” programs could help households and communities expand their asset base and be part of a broader educative program that enhances risk management.

These are several suggestions for moving from the conceptual framework to actions. Clearly there is only the beginning of a process that will include discussions of the conceptual framework, and its refinement. This paper raises many issues that will also require additional research. In the context of these discussions and follow-up research we will be better situated to design actions. In particular, we need to learn from past successes and failures to help vulnerable households deal with risk, both private and public sector strategies. Most important, it is critical to design pro-active risk management strategies that explicitly consider linkages between individual households, their communities and other communities, institutions and organizations.

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ANNEX

An Axiomatic Approach to Defining and Measuring Vulnerability

To clarify the definition of vulnerability presented in this paper, we introduce an axiomatic approach to measuring vulnerability.

Vulnerability, if it is to be a useful concept, should include dimensions of a household's level of well-being and of risk. A household that finds itself above the poverty line, but with a highly variable income, and who faces a small risk of falling below the poverty line, should not be considered more vulnerable than a household whose consumption level is certain, but below the poverty line.

First we present some basic concepts related to vulnerability and then use them to generate several measures of household vulnerability. These measures can be used to identify vulnerable households and classify them according to the depth and severity of their vulnerability, examine changes in households' vulnerability over time, and compare between different households at different points in time.

Let us consider two households over two time periods. Assume we have measures of the households' welfare (x_{it} for the i^{th} household in the t^{th} time period) and a given poverty line (x^*). We will define vulnerability in terms of the expected value of the outcome in period 2 given the state of nature in period 1 (this state of nature includes x_{i1} , or the current-period realization of well-being). The first consideration is that if these households have equal levels of well-being at time 1, then the household that is most likely to have a shortfall in well-being below some minimum level in time 2 is more vulnerable. That is, the household with the highest probability of falling below x^* in the second period is more vulnerable. The second consideration is that if the households have equal probabilities of change in well-being from one period to the next (e.g. the probability distribution of $x_{i2} - x_{i1}$ is identical for both households), then the household with a lower starting level of well-being is more vulnerable.

Given these simple propositions, a measure of household vulnerability is obtained. Define the expected value of x_{it+1} as $E(x_{it+1}) = \int x f(x) dx$. If $E(x_{it+1}) \leq x^*$ then the household is defined as vulnerable and $v_{it}=1$, otherwise, $v_{it}=0$. Using this simple measure, a vulnerability index analogous to the headcount index of poverty may be obtained by summing v_{it} over all households and dividing it by the total population.

However, information is lost during this aggregation, as households are assumed to be not vulnerable if, on average, their level of wellbeing in the next period exceeds the poverty line. Instead, define the probability of being poor as $\Pr\{x_{it+1} \leq x^* \mid x_{it}, A_{it}, Z_t\}$. A_{it} are conditioning variables that are specific to the household such as its assets (broadly defined) and Z_t are higher level exogenous variables such as rainfall, prices, policies, etc. Given a distribution of x_i ($f(x_i)$) then the probability of being poor is:

$$\Pr\{.\} = \int_0^{x^*} f(x_i) dx.$$

Then, call v_{it} this probability (i.e., $v_{it} = \Pr\{.\}$) and the vulnerability index for the population will be $\sum v_{it}/n$, where n is the size of the population.

To incorporate the second consideration (that is, the level of the shortfall), we need to consider not only the probability that an individual falls below the cutoff, but the distance below the cutoff for every possible outcome (x_{i2}). Hence, we use a measure similar to the depth of poverty measure. Define the following:

$$Di = \int_0^{x^*} \frac{(x^* - x_i)}{x^*} f(x_i) dx$$

The *vulnerability depth index* is $\sum D_i/n$. An analogous index of the severity of household vulnerability can be calculated by squaring the vulnerability depth index.

The three indices of vulnerability presented above are similar, yet different, from the widely used Foster-Greer-Thorbecke (FGT) (Foster et. al., 1984) poverty indices in that they consider the likelihood of falling below the cutoff, the expected proportional shortfall and the expected proportional shortfall squared. That is, depending on probability of risky events, households at time $t=1$ whose well-being is either above or below the poverty line might both be considered vulnerable.

The proposed measures of household vulnerability are an improvement over current methods of assessing poverty dynamics. Hazard models are normally used to estimate the duration of spells of poverty and non-poverty and, as such, produce information about the expected duration of a spell of poverty, or the probability that a person with certain characteristics moves into a state of poverty. These types of models do not generate information about the corresponding depth and severity of the shortfall.

Implementation

The definition and measurement of household vulnerability outlined above addresses the two basic issues associated with measuring poverty. First, we must measure the vulnerability of each individual (or household). In poverty analysis, this requires: (i) deciding on the welfare measure (usually consumption expenditures), (ii) deciding on the minimum level (i.e., poverty line) of that welfare measure for a household to be considered not poor, and (iii) comparing household welfare with respect to the poverty line.

The framework presented above is slightly more complex, as we are required to measure not only the position of the household with respect to the poverty line at a given point in time, but also the probability distribution associated with changes in levels of welfare from one period to the next. Obviously, more information and data are needed to implement the vulnerability measurement framework outlined above. The next step in conventional poverty analysis is to add up the levels of welfare of the poor. Typically, the three FGT indices are used to do so, and we propose a similar approach.

Econometric Estimation

An ideal means of implementing the proposed framework is to estimate the probability transition matrix, that is $\Pr\{x_{it+1}=x | x_{it}, A_{it}, Z_t\}$ for households of different types. Household panel data are preferred, but estimation is possible with data obtained from repeated cross-sectional surveys. If we were able to estimate the transition probability matrix, then simulations could be run to

examine a household's resiliency. Such a simulation would provide information on the combinations of assets and exogenous factors that could enable a household, once it has fallen below x^* , to climb back above it. Alternatively, it allows us to identify factors that hold households in poverty.

Note that the Z variables affecting the probability transition are what are called in this paper the risky "events." To measure the impact of the events on households, we need to observe how their welfare changes due to the events. With some events, this measurement is quite straightforward. For example, if we consider a sub-vector of Z to be commodity prices then response elasticities can be estimated using cross-sectional data. However, for more discrete events, such as droughts, the cross-sectional data would need to include households that experienced the drought and others that did not. The data would have to contain information on the value of consumption that results from various coping strategies.

Risk Modelling

An alternative to econometric estimation of the model is to explicitly incorporate risk into a simple linear programming based household model. Simulations could be run with different assumptions about risk perceptions and household objectives (e.g., Alwang, *et. al.*, 1997; Alwang and Siegel, 1999). Calculated surpluses (deficits) would strengthen (weaken) the household's asset base, and allow for a dynamic analysis. A "programmed" probability transition matrix could be created in such a fashion, and the implications of different asset mixes, constraints, and exogenous factors on household vulnerability could be measured.

In addition, linear programming models that explicitly incorporate risk (e.g., MOTAD models) and changing conditions (e.g., partial- or general-equilibrium models) or more sophisticated dynamic programming models could be constructed to generate an E-V frontier.